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REVISION OF CLICK BEETLES OF GENUS MELANOTUS IN AMERICA NORTH OF MEXICO (COLEOPTERA: ELATERIDAE)

By LAURENCE W. QUATE and SARAH E. THOMPSON[1]

Click beetles and wireworms of the genus *Melanotus* are common elements in the North American fauna. Some of the species are important to agriculture because the larvae are destructive to seeds and roots of corns, small grains, grasses, and some root crops; in spite of their importance, the North American species of the genus have never been revised. Early descriptions by LeConte (1853, 1866), Say (1823, etc.), Melsheimer (1846), Erichson (1842), and others are of little value in identifying the species. General treatments of local faunas (Blatchley, 1910; Dietrich, 1945; Brooks, 1960) are improvements but generally insufficient for identification except within a limited area. Descriptions of a few new species have appeared recently (Knull, 1959, 1962) and have increased the need for a thorough revision. M. C. Lane is the taxonomist most qualified to do this, having identified most North American collections of *Melanotus* in the past several decades, but the pressure of other duties has prevented him from committing his wide knowledge to print.

[1] Quate: B. P. Bishop Museum, Honolulu, Hawaii; Thompson: State Board of Health, Raleigh, N.C.

It was on the recommendation of Mr. Lane that in 1955 the senior author began a revision of North American *Melanotus*. Five years ago he was joined by the junior author. During most of this time, the work has been done during spare time by both.

The new species were recognized early in the study by the senior author and authorships are to be credited to him.

We have arrived at the following conclusions concerning the taxonomy of the genus: the features distinguishing one species from the other do not differ greatly; typical specimens of each species are identifiable on the basis of external characters; some specimens of each species vary enough to obscure the gap between the taxa; positive identification can be made by the study of the genitalia, which is specific in both sexes; and a natural division of the genus into subgeneric taxa is not apparent to us at this time.

One of the most striking features of the zoogeography of North American *Melanotus* is that the species are concentrated east of the 100th meridian. *Melanotus* in North America is predominantly an eastern genus (fig. 1). It is not within the scope of this paper to dwell at length on possible causes of this distributional pattern, but we may discuss it briefly. The apparent relationship of New and Old World faunas suggests that there have been migrations over a Bering Straits land bridge. We may further assume that the *Melanotus* click beetles which came from Eurasia and crossed the bridge stayed on the eastern side of the Rocky Mountains. This might have been the origin of the distributional pattern we see today. Adaptation to the more humid climate and edaphic conditions prevailing in the East may be responsible for the maintenance of the pattern.

In western North America there are only a few *Melanotus* and most of these are in the Southwest. There appears to be a group of species—*longulus*, *hamatus*, *lanceatus*, *beameri*, and *concisus*—which are derived from a single ancestor. Perhaps it was an offshoot from the main group in the East. At any rate, speciation has occurred in the Southwest where we now find the five species, and one of these has spread northward through the Great Basin and along the West Coast to Canada. In the northern part of its range it has further differentiated into a separate subspecies.

The two most distinctive species of North American *Melanotus* also are found in the Southwest. These are *cribricollis* and *chiricahuae*, and they are so distinct from others that we presume they are a Neotropical element.

The practical effect of these distributional patterns is that identification of *Melanotus* in the Far West is simple since there is only a single species with two subspecies; in the Southwest there are only a

few species with which to contend, so identification of that *Melanotus* fauna is not difficult. The bulk of the *Melanotus* are in the eastern half of the United States, and this is where the greatest problems of identification will be encountered.

It appears that nearly all American species of *Melanotus* north of Mexico are now known. Supporting this conclusion is the fact that of the 46 Nearctic *Melanotus* only nine (20 percent) are named in this paper or have been named in the last few years, and half of these have been recognized for at least 20 years. What few species may remain undiscovered are probably in the Southwest.

We have made an artificial division of *Melanotus* into three groups. The first two, containing nearly all the species, are based on the

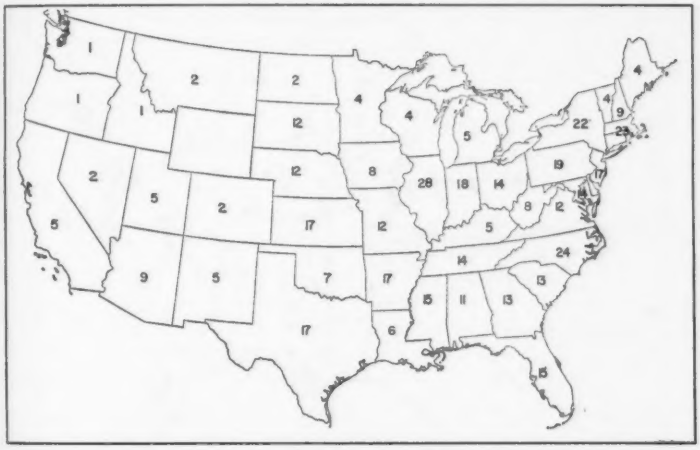

FIGURE 1.—Distribution of *Melanotus* in the United States (figures indicate the number of species recorded in each state or area).

presence or absence of mandibular pits. This is an obvious character and it simplifies identification; however, we do not feel that this single character indicates natural units, and the taxa based on it are merely utilitarian. The third group, composed of only *cribricollis* and *chiricahuae*, is characterized by large pronotal punctures and reduced parameres in the male genitalia; it is probably monophyletic.

A key has been prepared which will simplify identification of most specimens. The greatest difficulty will be individual variants that do not seem to quite fit either part of a couplet. Many revisions have failed to eliminate all deficiencies, but for the majority of specimens the key should provide a satisfactory shortcut to their proper identification.

The authors have been able to study all but six of the extant types. The locations of the types have been indicated in the appropriate places. Museums have been abbreviated thus: U.S. National Museum (USNM); Museum of Comparative Zoology, Harvard University (MCZ); Purdue University (PU); Cornell University (CU); University of Kansas (KU); California Academy of Sciences (CAS); British Museum (Natural History) (BMNH); Zoologisches Museum der Humboldt-Universität zu Berlin (ZM).

In addition to the types, over 13,000 specimens were examined by us during the course of this study.

FIGURE 2.—Distribution of the three types of female bursae of *Melanotus similis*.
○ normal ⊖ intermediate ● spiny

Morphological terms used by us are common ones, but those which might be unclear are defined. The "front" is the flat area between and above the eyes, bounded anteriorly by the "frontal margin." Below the frontal margin and occupying the central area between the antennae is the "nasale." On either side of the nasale and between it and the antennal bases is a pair of pits, the "parantennal foveae." Within some of the larger foveae is an elevated part that gives them an earlike appearance; the raised part is termed the "foveal tragus." The "mandibular pit" is a clearly marked depression of varying size on the lateral, exposed margin of the mandible.

The shape and measurements of the pronotum are important taxonomic features. The length is measured along the midline and does

not include the projection of posterolateral "hind angles." The width is measured as the widest part of the pronotum before the hind angles and is not affected by their expansion if they are wider than the rest of the prothorax. The relation of the antennal length to the pronotum used in the descriptions refers to the distance before or beyond the tip of the hind angles, which the antenna reaches when stretched along and parallel to the side of the pronotum.

As an indication of size, we have measured only the length of the elytra. This is more accurately measured than the whole length of the insect and is as useful as an indication of its overall dimension.

The genitalia of both sexes are important taxonomically, but the parts are simple and easily defined. Following the terminology of Snodgrass (1957), the male genitalia consist of a central "aedeagus" (median lobe) which is flanked by a pair of "parameres" (lateral lobes,

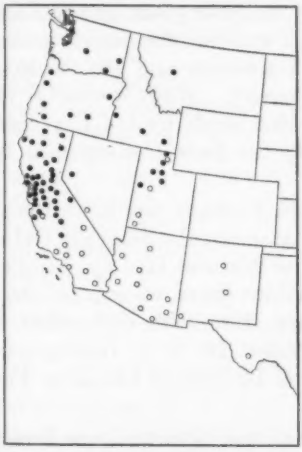

FIGURE 3.—Distribution of species.
○ *Melanotus longulus longulus*
● *M. l. oregonensis*

gonostyli). These are supported by the "phallobase." The paramere may be plain at the tip or expanded into an "apical blade." The taxonomically important parts of the female genitalia (fig. 5) are the large membranous sac, the "bursa," which contains spines of various shapes and number, and the "accessory gland" and "spermathecal duct," which arise from the bursa. A more detailed morphological description was given by Becker (1956); he also described the techniques used in dissecting the female genitalia. It is only necessary to add that light reflected from the substage mirror of a stereoptic microscope is helpful in seeing the delicate spermathecal duct, its diverticulum, and accessory gland.

Bibliographic references are intended to be complete; catalog references (Leng, 1920; Schenkling, 1927) are given only when new information is involved.

Because of the large number of records involved, distributional data have been reduced to listing states and counties (or locales and provinces) with the earliest and latest months of collections for each species. Only complete collecting data are given for the new species and the two subspecies.

M. C. Lane, Collaborator, Agricultural Research Service, USDA, has given invaluable assistance to this study. He permitted us to study specimens in his collection, allowed the use of his notes of type specimens, loaned numerous identified specimens, and identified many of the species in the early stages of this work.

Grants from the National Academy of Sciences (Marsh Fund Grant no. 130, 1960) and the American Philosophical Society (Grant 2614, Penrose Fund, 1960) permitted the senior author to study types in the Zoologisches Museum der Humboldt-Universität zu Berlin and the British Museum (Natural History). Another grant by the National Academy of Sciences (Marsh Fund) enabled the junior author to study *Melanotus* types at Purdue University and the Museum of Comparative Zoology, Harvard University. While a member of the faculty, the senior author was provided funds by the University of Nebraska Research Council to study the Lane Collection in Walla Walla, Wash.

Through the kindness of Prof. C. H. Lindroth and K. J. Hedquist, we were able to receive specimens of *M. communis* from the Gyllenhal Collection at the Swedish Museum of Natural History, Stockholm. While studying type specimens at various times, we enjoyed the help and hospitality of Dr. K. Delkeskamp, Humboldt-Universität, Miss C. M. F. von Hayek, British University; Dr. P. J. Darlington, Jr., Museum of Comparative Zoology; and Dr. Leland Chandler, Purdue University.

The large collections of the U.S. National Museum have been vital to our studies. We are indebted to the officials of the Smithsonian Institution and T. J. Spilman, USDA, for the privilege of studying the material.

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List of North American *Melanotus*

Similis Group

(Mandible without pit)

1. *similis* (Kirby)
2. *spadix* (Erichson)
3. *decumanus* (Erichson)
4. *castanipes* (Paykull)
5. *communis* (Gyllenhal)
6. *indistinctus*, new species
7. *dietrichi*, new species
8. *miscellus*, new species
9. *verberans* (LeConte)
10. *emissus* (LeConte)
11. *lanei*, new species
12. *pilosus* Blatchley
13. *opacicollis* (LeConte)
14. *clandestinus* (Erichson)
15. *ignobilis* Melsheimer

Americanus Group

(Mandible with pit)

16. *depressus* (Melsheimer)
17. *morosus* Candèze
18. *cribulosus* (LeConte)
19. *corticinus* (Say)
20. *sagittarius* (LeConte)
21. *hyslopi* van Zwaluwenburg
22. *prasinus* Blatchley
23. *piceatus* Blatchley
24. *difficilis* Blatchley
25. *macer* (LeConte)
26. *testaceus* (Melsheimer)
27. *trapezoideus* (LeConte)
28. *tenax* (Say)
29. *pertinax* (Say)
30. *infaustus* (LeConte)
31. *parallelus* Blatchley
32. *americanus* (Herbst)
33. *cribriventris* Blatchley
34. *obscuratus* Blatchley
35. *beameri*, new species
36. *concisus* Knull
37. *lanceatus*, new species
38. *hamatus* Knull
39. *longulus longulus* (LeConte)
40. *l. oregonensis* (LeConte)
41. *gradatus* (LeConte)
42. *insipiens* (Say)
43. *leonardi* (LeConte)
44. *taenicollis* (LeConte)

Cribricollis Group

45. *cribricollis* Candèze
46. *chiricahuae* Knull

List of Synonymical Names in North American *Melanotus*

abdominalis (Erichson) = 2. *spadix* (Erichson)
angustatus (Erichson) = 32. *americanus* (Herbst)
blatchleyi Leng = 33. *cribriventris* Blatchley
canadensis Candèze = 3. *decumanus* (Erichson)
carinus Blatchley = 20. *sagittarius* (LeConte)
cuneatus (LeConte) = 3. *decumanus* (Erichson)
debilis Blatchley = 17. *morosus* Candèze
divarcarinus Blatchley = 16. *depressus* (Melsheimer)
dubius (LeConte) = 26. *testaceus* (Melsheimer)
exuberans (LeConte) = 1. *similis* (Kirby)
fissilis (Say) = 1. *similis* (Kirby)
franciscanus Van Dyke = 40. *longulus oregonensis* (LeConte)
glandicolor (Melsheimer) = 19. *corticinus* (Say)
inaequalis (LeConte) = 4. *castanipes* (Paykull)

incertus (LeConte)=3. *decumanus* (Erichson)
laticollis (Erichson)=1. *similis* (Kirby)
lizus Blatchley=16. *depressus* (Melsheimer)
longicornis Blatchley=33. *cribriventris* Blatchley
longulus (LeConte)=17. *morosus* Candèze
ochraceipennis Melsheimer=1. *similis* (Kirby)
paganus Candèze=5. *communis* (Gyllenhal)
paradoxus (Melsheimer)=4. *castanipes* (Paykull)
parumpunctatus (Melsheimer)=16. *depressus* (Melsheimer)
peninsularis Candèze=14. *clandestinus* (Erichson)
perplexus Blatchley=14. *clandestinus* (Erichson)
prolixus (Erichson)=1. *similis* (Kirby)
scrobricollis (LeConte)=4. *castanipes* (Paykull)
secretus (LeConte)=15. *ignobilis* Melsheimer
simulans Blatchley=17. *morosus* Candèze
sphenoidalis (Melsheimer)=1. *similis* (Kirby)
tenellus (Erichson)=42. *insipiens* (Say)
texanus Candèze=4. *castanipes* (Paykull)
variolatus LeConte=40. *longulus oregonensis* (LeConte)
vetulus (Erichson)=19. *corticinus* (Say)

Melanotus Eschscholtz

Melanotus Eschscholtz, 1829, p. 32. [For additional references, see Schenkling, 1927, p. 271.]
Perimecus Stephens, 1830, p. 263 [Type: *Elater fulvipes* Herbst, by monotypy.]
Ctenonychus Stephens, 1830, p. 272 [Type: *Ctenonychus hirsutus* Stephens, by monotypy.]
Cratonychus Dejean, 1833, p. 87. [Type: *Elater obscurus* Oliver, designated by Blanchard, 1845, p. 76.]

Type species: *Elater fulvipes* Herbst, designated by Westwood, 1840, p. 26.

Adult (partly after Lane, in litt.): Color usually uniformly yellowish brown to dark reddish brown, only 2 species bicolored. Head with front coarsely punctate, punctures hexagonal and separated by less than own diameter; frontal margin complete, carinate (sometimes obsolescent); parantennal fovea and nasale variously developed, but well defined (nasale indistinct in few species). Antenna 11-segmented; segment 1 elongate and cylindrical, 2 spherical, 3 variable from spherical and equal size of 2 to much longer and triangular, 4 and following triangular; male only with dense, erect hairs on mesal margin. Palpus 3-segmented, light reddish brown and lighter than rest of body.

Pronotal punctures present, but size and distribution variable; hind angles well developed and carinate. Elytron with 9 striae formed by rows of punctures and rows of quadrate, subcuticular spots under striae. No prothoracic groove for receiving antenna; meso- and metasternum not meeting to enclose mesocoxal cavities, mesocoxae separated, metasternum truncate anteriorly. Tibiae with

apical spurs; tarsal claws pectinate; tarsi simple, without lobes. Punctures on venter of body teardrop shaped.

Key to North American Species of *Melanotus*

1. Pronotum and elytron of different colors, pronotum partly or completely reddish orange and elytron black 2
   Pronotum and elytron of same color 3
2(1). Pronotum almost entirely orange and abdomen entirely black; antenna of ♂ usually exceeding tip of hind angle by 1 segment or less, ♀ antenna ending about at tip . . . . . **43. leonardi**
   Pronotum black in center and orange elsewhere, and abdominal venter partly or entirely orange; antenna of ♂ ending before tip of hind angle by about 1 segment and less in ♀ . . . . . **44. taenicollis**
3(1). Antennal segments 4 and following much longer than wide; antenna generally extends to or beyond hind angle; not with following combination 4
   Antennal segments 4 and most of following wider than long, and lobes lighter in color than rest of antenna; antenna ends 2 or more segments before tip of hind angle; frontal margin slightly indented in center, when viewed from front curves down, and hence nasale is only narrow space between frontal margin and clypeus; frontal and pronotal punctures very large; Arizona to Baja California . . **45. cribricollis**
4(3). Mandible without pit on lateral, exposed margin 5
   Mandible with pit on lateral margin 21

Similis Group

(Mandible without pit on lateral margin)

5(4). Antennal segment 3 small, subequal to 2 or at least much nearer size of 2 than 4 6
   Antennal segment 3 intermediate in size between 2 and 4, clearly larger than 2 8
6(5). Antennal segments beyond 3 triangular, same color as body, triangular, erect male hairs well developed 7
   Antennal segments beyond 3 testaceous, lighter in color than rest of body, subquadrate, erect male hairs poorly developed; sides of pronotum with marked concavity before hind angles, angles rather small and not widely divergent; ♂ paramere incurved near center and tapering to point, without apical blade . . . . . **15. ignobilis**
7(6). Smaller species, elytron less than 8.0 mm; frontal margin thin and jutting over nasale; nasale and parantennal fovea obsolescent; sides of pronotum with concavity before hind angles, angles small; ♂ paramere with apical blade . . . . . **14. clandestinus**
   Large species, elytron more than 9.0 mm; frontal margin not strongly jutting over nasale; nasale and parantennal fovea poorly developed, but usually present; sides of pronotum often straight and divergent posteriorly with large hind angles; ♂ paramere with apical blade . . . . . **4. castanipes**
8(5). Frontal and pronotal punctures not greatly enlarged; punctures on venter of abdomen oblong and lateral ones but little larger than central ones; ♂ paramere little shorter than aedeagus and with apical blades 9

Frontal and pronotal punctures very large (fig. 10*l*); punctures on venter of abdomen teardrop shaped and lateral ones several times larger than central ones; ♂ paramere about two-thirds length of aedeagus and abruptly tapering to sharp, recurved apex; New Mexico to Baja California . . . . . **46. chiricahuae**

9(8). Pronotum wider than long 10
Pronotum narrow, longer than wide (measured in front of hind angles); frontal margin scoop shaped, jutting and a little upturned. **31. parallelus** (part)

10(9). Pronotal punctures not so thick as to appear granulose; vestiture of thorax and elytra of about same length and density 11
Pronotal punctures very dense and appearing granulose; vestiture of pronotum short and fine, nearly velvety, considerably denser than on elytra . . . . . **13. opacicollis**

11(10). Pronotal punctures smaller than those on frons, dense and nearly contiguous on all sides; small species, elytron length less than 7.5 mm . 12
Pronotal punctures sparser and larger; most species with elytron length 7.5 mm or more 13

12(11). Vestiture of thorax rather sparse, that on venter sparser than on dorsum; antennal segment 3 intermediate in size between 2 and 4; frontal margin not upturned . . . . . **11. lanei**
Vestiture of thorax long and thick, that on venter as long and thick as on dorsum; antennal segment 3 shorter, closer to length of 2 than 4; frontal margin thin, shelflike and a little upturned . . . **12. pilosus**

13(11). Frontal margin not strongly protuberant, usually without a depression before margin 14
Frontal margin strongly protuberant, when viewed from side extends out in shelflike extension, marked depression behind margin; ♀ bursa without spines or with only patch of 5–8 small spines on each side near base; ♂ paramere with margins before apical blade straight and without indentation; large species, elytron 10–12mm. **3. decumanus**

14(13). Frontal margin well defined, dark brown or black, not weakened in center; elytron rarely as long as 13 mm and most species considerably less 15
Frontal margin usually weakened in center, when viewed directly in front appears obliterated and without black margin in center; large species with elytron 11.4–14.9 mm (aver. 13 mm); ♀ bursa with spines in large basal packet and small, separated distal patch (fig. 5*f*). **4. castanipes,** females

15(14). Antennal segment 4 about 1½ times as long as wide and considerably wider than 3; elytron often less than 10 mm long 16
Antennal segment 4 usually slender, about two times as long as wide and only a little wider than 3; average elytron length 10.8 mm; ♂ gonostyle with thick patch of 30–40 long, soft hairs on apical blade (fig. 1*e*); ♀ bursa with dense packet of long, close-set spines arranged nearly in trapezoid (fig. 5*e*) . . . . . **2. spadix**

16(15). Pronotal punctures smaller than those on front, those in center generally separated by at least own diameter; elytron usually less than 8 mm long; ♂ aedeagus parallel sided until near apex and sharply tapering to acute tip 17

Pronotal punctures subequal in size to those on front; elytron usually more than 8 mm; ♂ aedeagus often with convergent sides and tapering to tip 18

17(16). Antenna same color as head and thorax; ♂ paramere evenly tapering to apical blade; outer margin of apical blade nearly straight . **9. verberans**

Antenna usually lighter in color than head and thorax; ♂ paramere with marked constriction at base of blade; outer margin of blade rounded . . . . . **10. emissus**

18(16). Male aedeagus broad until near apex and then abruptly tapering to apex; spines of ♀ bursa confined to basal third 19

Male aedeagus slender and evenly tapering from base to apex; spines of ♀ bursa in center 20

19(18). Pronotal punctures large and separated by less than own diameter; dark reddish brown to black species; spines of ♀ bursa without large base (fig. 8*b*); ♂ genitalia as in figs. 4*a–d* . . . . . **1. similis**

Pronotal punctures smaller and central punctures separated by own diameter; reddish-brown species; spines of ♀ bursa with large, plaque-like bases (fig. 9*c*); ♂ genitalia as in figs. 4*j–l* . . . . . **8. miscellus**

20(18). Male genitalia as in fig. 4*j* . . . . . **5. communis**

Male genitalia as in fig. 4*k* . . . . . **6. indistinctus**

Male genitalia as in fig. 4*l* . . . . . **7. dietrichi**

Americanus Group

(Mandible with pit on lateral margin)

21(4). Antennal segment 3 small, subequal to 2 (in doubtful cases of some ♀♀, 3 less than 1½ length of 2) 22

Antennal segment 3 intermediate in size between 2 and 4, clearly larger than 2 (in doubtful cases of some ♀♀, more than 1½ length of 2) 27

22(21). Small species, elytron less than 6 mm 23

Larger species, elytron more than 6 mm 24

23(22). Pronotum wider than long; pronotal punctures smaller than those on front and sparse, widely separated, equal size throughout; East Coast to Nebraska . . . . . **32. americanus**

Pronotal punctures coarse, larger than on front on anterior two-thirds and fine, sparse on basal one-third in ♂; Southwest . **36. concisus**

24(22). Antenna exceeds tip of hind angle by 1–4 segments; parantennal fovea large; flagellar segments elongate 25

Antenna of ♂ barely exceeds tip of hind angle, ♀ antenna shorter; parantennal fovea, clearly smaller than antennal segment 2; flagellar segments triangular, not elongate; pronotal punctures large and dense; ♂ paramere with peculiar, winglike flaps near center; Texas. **38. hamatus**

25(24). Elytron length 6–8 mm. 26

Large species, elytron 8.5–11.5 mm; nasale quadrate, about as wide as high; antenna exceeds tip of hind angle by about 2 segments; ♂ paramere with definite apical blade and antennal hairs long and dense. **19. corticinus**

26(25). Antenna very long, exceeds tip of hind angle by 2–4 segments; sides of pronotum divergent posteriorly; nasal narrow, higher than wide. **33. cribriventris**

Antenna shorter, exceeds tip of hind angle by no more than 1 segment; sides of pronotum subparallel; nasale much wider than high. **34. obscuratus**

27(21). Elytron more than 5 mm 28
Very small species, elytron less than 4.5 mm; nasale flat; frontal margin rounded, moderately thin and jutting; pronotal punctures nearly as large as those on front; parantennal and mandibular foveae relatively large; southeast U.S. to Texas . . . . . **42. insipiens**

28(27). Pronotal punctures and vestiture uniform except usual small increase in density and size along sides 29
Pronotal punctures change from rather sparse anteriorly to smaller and denser along posterior border, vestiture also becomes fine over same area; antenna of ♂ exceeds tip of hind angle by no more than one-half segment, ♀ antenna shorter; ♂ aedeagus broad; paramere with small apical blade; elytron about 8.5 mm long . . . . . **41. gradatus**

29(28). Parantennal fovea very large, as large or larger than antennal segment 3; nasale large and protuberant, especially in ♂; frontal margin strongly projecting, angular with blunt apex when viewed from above; elytron 8 mm or more; sides of pronotum straight behind anterior curvature and divergent posteriorly, pronotum wider than long 30
Parantennal fovea clearly smaller than antennal segment 3; not with above combination 31

30(29). Frontal margin scarcely overhanging protruding nasale, not extended in angular apex; pronotal punctures as large as those on front; ♂ paramere with apical blade; elytron 8.9–11.2 mm . . **20. sagittarius**
Frontal margin overhanging nasale and usually curved down on sides above nasale, margin extends out sharply and ends in truncated, angular apex; pronotal punctures smaller than those on front; ♂ paramere without apical blade; elytron 8.2–9.3 mm . . . **21. hysloni**

31(29). Sides of pronotum straight behind small anterior curvature; hind angles large and expanded, beginning at about center of pronotum and thence noticeably divergent, carina usually long and distinct 32
Sides of pronotum concave or parallel from center to base of hind angles, which arise well behind center; not with above combination of characters 34

32(31). Parantennal fovea and nasale large and well developed, nasale about as high as wide; antenna not greatly elongate; smaller species, elytron 7.5 mm or less 33
Parantennal fovea and nasale weak, nasale wider than high; antenna very long, exceeds tip of hind angle by 3–4 segments, flagellar segments elongate and slender, 4 about twice as long as wide; pronotal punctures about as large as those on front and separated by own diameter; apex of last visible sternite slightly inflated; elytron 8.5–10 mm. **24. difficilis**

33(32). Pronotal punctures smaller than those on front; frontal margin often rounded in center; ♂ paramere expanded at base, abruptly rounded at tip . . . . . **26. testaceus**
Pronotal punctures about same size as those on front (but widely separated); frontal margin often coming to blunt point in center; ♂ paramere slender, gently tapering to tip . . . . **27. trapezoideus**

34(31). Frontal margin thin, shelflike, and extending in front of nasale by several times width of black rim, front with depression behind margin; parantennal fovea small 35

Frontal margin not strongly protruding 36

35(34). Pronotal punctures separated by no more than own diameter; flagellar segments elongate, ♂ antenna exceeds tip of hind angle by 3–4 segments; elytron about 7 mm . . . . . 25. **macer**

Pronotal punctures sparse, separated by more than own diameter; flagellar segments triangular, antenna exceeds hind angle by no more than 2 segments; mandibular pit very small; elytron 6–7 mm. 31. **parallelus**

36(34). Antenna extending to or beyond hind margin of pronotum 37

Antenna short, ending before hind margin of pronotum in both sexes; nasale flat, shallow; ♂ paramere slender, aedeagus broad until near apex . . . . . 23. **piceatus**

37(36). Nasale clearly defined, not obsolescent; color reddish brown or darker. 38

Nasale obsolescent; color brownish yellow; ♂ paramere without apical blade; pronotal punctures large and compact; vestiture rather thick; small species, elytron 5.0–6.5 mm; Texas . . . . . 35. **beameri**

38(37). Antenna, legs, and body of same color 39

Antenna and legs reddish brown and body black (teneral specimens with body dark brown but darker than appendages); pronotum convex and rounded dorsally, rounded and concave at base of hind angles; central pronotal punctures small and sparse; ♂ paramere without apical blade . . . . . 29. **pertinax**

39(38). Western U.S., not occurring east of New Mexico 40

Eastern U.S. and as far west as western Texas, Kansas, etc 41

40(39). Reddish-brown species; southwestern U.S. from south of Tehachapi Mts., California to New Mexico, elytron 6.5–9.8 mm. 39. **longulus longulus**

Dark reddish-brown to black species; California north of Tehachapi Mts., Great Basin, Pacific Northwest; elytron 7.5–10.9 mm. 40. **longulus oregonensis**

41(39). Larger species, elytron more than 7.5 mm 42

Smaller species, elytron less than 7.5 mm 44

42(41). Parantennal fovea well developed; pronotal punctures well separated 43

Parantennal fovea shallow; nasale flat; pronotal punctures very close together; ♂ paramere tapering and lateral margin straight; color usually reddish brown . . . . . 18. **cribulosus**

43(42). Sides of pronotum parallel or concave over distal half; pronotal punctures usually smaller than those on front; color often reddish brown. 17. **morosus**

Sides of pronotum divergent posteriorly; pronotal punctures usually as large as those on front; color usually dark reddish brown, darker than *morosus* . . . . . 16. **depressus**

44(41). Nasale well developed, about as wide as high 45

Nasale flat, not protuberant, wider than high 46

45(44). Pronotal punctures about as large as those on front; pronotum flattened and not rounded . . . . . 27. **trapezoideus** (part)

Pronotal punctures small, smaller than those on front; pronotum rounded . . . . . 32. **americanus** (part)

46(44). Side of pronotum straight, without curvature before hind angle . . 47

Side of pronotum with slight curvature before hind angle; frontal margin broad and nearly straight when viewed from above . . 22. **prasinus**

47(46). Male paramere with definite apical blade; thorax about as long as wide; distributed in central and south central U.S 48
Male paramere without apical blade; thorax wider than long; largely distributed along east coast . . . . . 28. **tenax**

48(47). Male paramere not unusually slender, base of apical blade angled at about 90° . . . . . 30. **infaustus**
Male paramere very slender, base of apical blade gently rounded and not strongly angulate . . . . . 37. **lanceatus**

The *similis* Group

(Mandible with pit on lateral margin)

1. *Melanotus similis* (Kirby)

FIGURES 4*a–d*, 8*b*, *c*; PLATE 1*a*

Perimecus similis Kirby, 1837, p. 149.
Melanotus similis.—Erichson, 1842, p. 116.—Candèze, 1860, p. 363.
Elater fissilis Say, 1839, p. 183. [New synonymy.]
Cratonychus fissilis.—LeConte, 1853, p. 477.
Melanotus fissilis.—Candèze, 1860, p. 352.—Blatchley, 1910, p. 750.—Van Zwaluwenburg, 1922, p. 12.—Thomas, 1941, p. 259.—Dietrich, 1945, p. 57.—Severin, 1949, p. 16.—Brooks, 1960, p. 40.
Cratonychus laticollis.—Erichson, 1842, p. 102.
Ctenonychus ochraceipennis Melsheimer, 1846, p. 150.
Melanotus ochraceipennis.—Thomas, 1941, p. 259.
Ctenonychus sphenoidalis Melsheimer, 1846, p. 150.
Melanotus sphenoidalis.—Thomas, 1941, p. 260.
Cratonychus exuberans LeConte, 1853, p. 477. [New synonymy.]
Melanotus exuberans.—Candèze, 1860, p. 354.—Thomas, 1941, p. 260.

MALE.—Body color dark reddish brown, covered with yellowish hairs evenly distributed over body.

Head: Front coarsely punctate, most punctures hexagonal shaped, distance between punctures less than half puncture diameter, center slightly protuberant; clypeus lightly punctate, parantennal fovea shallow, width of nasale 1½ to 2 times height. Mandible without pit; palpi yellowish brown. Antenna exceeds tip of hind angle by 2 segments, average ratio of segments 2:3:4=4:8:12; erect male hairs moderately dense, often sparse enough to be inconspicuous; third segment 1½ to 2 times longer than wide; outer angles of flagellar segments often lighter in color than rest of segment, usually testaceous.

Pronotum often moderately flattened and expanded; wider than long, ratio of width length=1.18 (1.06–1.25); punctures moderately coarse at center, about size of those of front, separated by distance equal to less than puncture diameter, punctures little more dense on sides and front, oval shaped except those on anterior angles hexagonal shaped as on front; hind angles divergent, often with 2 carinae; side concave before hind angle.

Elytron with punctures of striae moderately deep, separated by distance equal to less than own diameter, interstrial area at center of elytron about 3 times as wide as puncture diameter. Venter of metathorax and abdomen with evenly distributed, elongate punctures. Metacoxal plate evenly tapering to apex. Genitalia as figured; paramere with well-defined angle at tip, with about 8 hairs along outer angle of apical blade.

Elytron: 9.4 ± 0.5 mm (7.9–11.4). 180 spec.

FEMALE.—Similar to male, larger, antenna shorter, extending to tip of hind angle. Genitalia as figured, bursa with few to large number of spines, spines short, about as long as diameter of base, accessory gland very long and slender, as long as spermathecal duct and one-half as wide, diverticulum branching near center of sperm, duct without visible blind pouch apically in usual position near spermatheca.

Elytron: 10.2 ± 0.9 mm (8.4–12.8). 120 spec.

TYPES.—Lectotype of *similis:* Male, "Amer. Bor./ex Mus. Murray/ Frey Coll. 1905–100" (BMNH). Selected by Quate, 1960.

Types of *fissilis:* Specimens lost.

Lectotype of *laticollis:* Male, "Amer. Sept., Norwish" (ZM). Lectotype selected by Quate, 1960, from cotypes of 1 male and 5 females.

Lectotype of *ochraceipennis:* Female, "Pa./Ziegler" (MCZ). Selected by Quate, 1962. First specimen of this species in Melsheimer Collection too badly broken for positive identification and therefore not selected as lectotype.

Type of *sphenoidalis:* Male. "Pa." (MCZ). Only specimen in Melsheimer Collection.

Lectotype of *exuberans:* Male, probably Santa Fe, N. Mex. (MCZ). First specimen in type series selected by Quate, 1962. Second specimen of type series is a female belonging to the *communis* complex and is not *exuberans.*

DISTRIBUTION.—Southern Canada and U.S. east of Montana, Utah, and Arizona; southwest to southern California andMexico.

ALABAMA: Mobile; February, June. ARIZONA: Apache, Cochise, Coconino, Gila, Graham, Madera, Maricopa, Pinal, Pima, Santa Cruz, Yavapai, Yuma; April, October. ARKANSAS: Hempstead, Lawrence, Polk, Washington; March, June. CALIFORNIA: Riverside (Blythe); May, July. COLORADO: El Paso, Montezuma (Berkeley); July, August. CONNECTICUT: Fairfield, Hartford, Litchfield (January, reared?), Middlesex, New Haven, Tolland; May–November. FLORIDA: Brevard, Hendry, Manatee, Orange, Osceola, Palm Beach, Seminole, Volusia; February, August. GEORGIA: Chatham, Floyd, Fulton, Peach, Thomas, Warren, Okefenoke Swamp; March, September. ILLINOIS: Boone, Champaign, Cook, DeKalb, Edgar, Iroquois, Jackson, Jo Daviess, Johnson, Kanakakee, Lake McHenry, McLean, Marion, Marshall, Mason, Peoria, Putnam, Union, Vermilion; March, September. INDIANA: Clark, DeKalb, Greene, Knox, Lake, Marion, Orange, Porter, Pulaski, Stark, Steuben, Tippecanoe, White; April, October.

IOWA: Buchanan, Clayton, Fayette, Floyd (reared), Franklin, Harrison, Henry, Jasper, Johnson, Muscatine, Pottawattamie, Poweshiek, Story, Woodbury; May, October. KANSAS: Atchinson, Bourbon, Clark, Decatur, Dickinson, Doniphan, Douglas, Gove, Gray, Johnson, McPherson, Miami, Norton, Osborne, Pottawatomie, Rawlins, Reno, Riley, Scott, Sedgwick, Shawnee, Sheridan, Sumner; April, August. KENTUCKY: Jefferson, Ohio: June, August. LOUISIANA: Lafourche, Orleans, Plaquemines, St. Landry, St. Tammany; January, September. MAINE: Penobscot, Washington; June, July. MARYLAND: Anne Arundel, Calvert, Harford, Montgomery, Plummers Isl., Prince Georges, Queen Annes, Washington; April, December. MASSACHUSETTS: Berkshire, Essex, Franklin, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, Suffolk, Worcester; April, September. MICHIGAN: Calhoun, Cheboygan, Huron, Monroe, Oakland, Ottawa, St. Clair, Sanilac, Tuscola, Wayne; April, August. MINNESOTA: Big Stone, Dakota, Hennepin, Pope, Ramsey, St. Louis, Winona, Wright; May, August. MISSISSIPPI: George, Greene, Lauderdale, Oktibbeha; January, September. MISSOURI: Boone, Buchanan, Callaway, Cape Girardeau, Lawrence, Pike, St. Louis, Wayne; April, October. MONTANA: Custer; August. NEBRASKA: Dakota, Dawes, Dodge, Holt, Lancaster, Lincoln, Otoe, Red Willow, Scotts Bluff, Sioux, Washington; May, August. NEW HAMPSHIRE: Coos, Strafford; May, June. NEW JERSEY: Atlantic, Bergen, Burlington, Gloucester, Middlesex, Morris, Ocean; April, November. NEW MEXICO: Bernalillo, Dona Ana, Grant, Lincoln, Sandoval, San Miguel, Santa Fe, Socorro; June, August. NEW YORK: Albany, Cattaraugus, Cayuga, Clinton, Columbia, Cortland, Delaware, Dutchess, Erie, Essex, Franklin, Greene, Herkimer, Jefferson, Madison, Monroe, Nassau, New York, Niagara, Oneida, Ontario, Orange, Orleans, Oswego, Queens, St. Lawrence, Suffolk, Sullivan, Tompkins, Ulster, Warren, Wayne, Westchester, Wyoming, Yates; March, October. NORTH CAROLINA: Buncombe, Chowan, Iredell, Pasquotank, Polk, Richmond, Swain, Wake, Watauga, Wilson; April, July. NORTH DAKOTA: Cass, Grand Forks; June. OHIO: Ashtabula, Athens, Delaware, Fairfield, Franklin, Fulton, Greene, Hamilton, Hocking, Holmes, Lucas, Pike, Preble, Summit, Warren; May, October. OKLAHOMA: Atoka, Cleveland, Latimer, Oklahoma, Tulsa; March, July. PENNSYLVANIA: Adams, Allegheny, Bradford, Dauphin, Delaware, Erie, Franklin, Lehigh, Lycoming, Montgomery, Northampton, Philadelphia, Sullivan, Susquehanna, Westmoreland, York; March, October (Janaury and December, reared or in hibernation?). RHODE ISLAND: Washington; June, July. SOUTH CAROLINA: Oconee; April, August. SOUTH DAKOTA: Brookings, Codington, Sanborn, Union; June, July. TENNESSEE: Davidson, Knox, Morgan, Sevier, Smith; January, August. TEXAS: Anderson, Bexar, Brazos, Brewster, Cameron, Colemen, Dallas, Goliad, Jeff Davis, Jim Wells, Lamar, Lubbock, Palo Pinto, Presidio, Smith, Shelby, Travis, Victoria, Wallers, Wharton, Wilbarger, Williamson; February, September. UTAH: Cache, San Juan, Utah, Washington, Zion Canyon; June, July. VERMONT: Orange, Windham; May. VIRGINIA: Fairfax, Montgomery, Nelson; June. WASHINGTON, D.C.: March, December. WEST VIRGINIA: Greenbrier, Lewis, Preston; July, August. WISCONSIN: Bayfield, Columbia, Dane, Dodge, Grant, Jefferson, Lafayette, Rock, Sauk, Trempealeau, Waukesha; June, November. MANITOBA: Aweme, Killarney, Winnipeg; June, August. NOVA SCOTIA: Annapolis Royal; June. ONTARIO: Belleville, Muskoka, Ottawa, Prince Edward, Ridgeway, Sudbury, Toronto; May, July. QUEBEC: Aylmer, Montreal, Mt. St. Hilaire, Rigaud, St. Johns; June, August.

It is regrettable that the widely used name *fissilis* has to be replaced by the unfamiliar *similis;* however, both Mr. Lane and the senior

author have examined types of *similis*, and there is no doubt that that species is the same as the one known as *fissilis*.

Melanotus similis exhibits a good deal of variation throughout its range. Variations in the ratio of the thoracic width to length, in the size of the pronotal punctures, in the shape of the distal enlargement of the male paramere, and the spines of the female bursa have been observed. Some of the variation appears in a regular pattern with an east-west cline and some is oriented in a north-south pattern in an irregular manner. The two patterns are noncorrelated and independent of each other (fig. 2).

The eastern populations of *M. similis* have a relatively wider pronotum which generally narrows to the west and finally the narrowest pronotum is found in the Southwest. There is an approximate east-west clinal variation, but this is irregular through the Midwest. Table 1 shows the ratios of the pronotal length/width. There is no significant difference between adjacent populations, but, as shown in the chart, there are significant differences between nonadjacent populations. All measurements were made of males with dissected genitalia. Females are not included because samples of uniform sizes were not available in dissected specimens; however, less extensive analysis of females indicates that a similar pattern also exists in that sex.

The male genitalia show variation roughly correlated with the pronotal width/length ratio. No satisfactory means of expressing the difference qualitatively was found, but the differences in various parts of the range are illustrated in figures 5*a–e*. Generally, the distal enlargement of the paramere is longer and the subapical indentation is more abrupt in eastern populations, but there is less constancy than in the pronotal variation and only a weak clinal trend is noted. From a taxonomic viewpoint, the differences are not great enough to cause difficulty with identification, and the male genitalia are the most reliable criteria for recognition of the species.

The female genitalia display marked differences in the number of spines on the bursa. Females can be sorted roughly into three classes on the basis of the bursal spines. In the northern and western part of its range, the three types are found with a little dominance of the "normal" type, which has few spines; in the southeastern United States there is almost exclusively the "spiny" type, which has a large number of spines (fig. 2). There are intermediates to the two types which unite them in a gradient series, and no formal taxonomic discrimination is warranted.

Ratio of width/length of pronotum of *Melanotus similis* (analysis based on 20 males from each area, total of 140 specimens):

New York	*Illinois*	*Iowa Missouri*	*Kansas*	*Lincoln, Nebraska*	*North Platte, Nebraska*	*Arizona*
1. 20	1. 19	1. 17	1. 16	1. 17	1. 14	1. 12

LSD 0.01=0.024

In the southwestern United States there is a form which has been described under the name *exuberans*. Many specimens of this form appear quite different from typical *similis*—the punctures of the pronotum are more coarse and dense, the pronotum is narrower, the distal enlargement of the paramere is smaller, and the indentation is gradual and not abrupt. Viewed apart, this form does appear to be a distinct species, but the complete picture shows it is connected with other *similis* forms by an intergrading series. The shape of the pronotum and genitalia appears to be merely an extreme extension of the clinal trend described above, and southwestern specimens are more similar to specimens from western Nebraska, Kansas, Texas, and eastern Colorado than to eastern populations. The narrower pronotum and smaller genitalia are characteristic of the western populations; furthermore, in the same locality one finds typical "*exuberans*" types intermediated with clear intergrades to typical *similis*. Specimens have been seen with the coarse pronotal punctation of "*exuberans*," typical *similis* genitalia, and others with the opposite combination. Some are intermediate between the two forms in both features. Females possess the "spiny" bursa and are quite like other *similis* females except that generally they have coarser pronotal punctation. It therefore appears that "*exuberans*" is a synonym of *similis* and represents a geographical variant not defined well enough to justify segregating it as a separate taxon. (A similar, though less well documented, trend to larger pronotal punctures and a narrower pronotum was also noted in *communis* from the Southwest.)

Most specimens identified by Mr. Lane or by us will be labelled in collections as *M. fissilis* Say.

2. *Melanotus spadix* (Erichson)

FIGURES 4*e*, 8*e*

Cratonychus spadix Erichson, 1842, p. 103.
Melanotus spadix.—Candèze, 1860, p. 354.
Melanotus abdominalis of authors, not Erichson, 1842.
Melanotus decumanus.—Dietrich (not Erichson), 1945, p. 55.

MALE.—Large species, body color reddish brown to dark reddish brown, covered with yellowish hairs evenly distributed over body.

Head: Front coarsely punctate, most punctures hexagonal shaped, distance between punctures less than half puncture diameter, surface sometimes with slight, broad depression anteriorly, frontal margin evenly convex, not strongly protuberant; parantennal fovea very

shallow. Mandible without pit; palpi reddish to yellowish brown. Antenna exceeds tip of hind angle by about 2 segments, erect male hairs usually very dense and readily observed; average ratio of segments 2:3:4=4:8:13, segment 4 slender, about twice as long as maximum width (10:6), outer parts of flagellar segment lighter in color than rest of segment.

Pronotum wider than long, ratio of width/length=1.2; punctures about same size as those of front, at center separated by distance equal to puncture diameter or less, little more dense on sides and front, oval in shape except those on anterior angles hexagonal shaped as on front; hind angles divergent, with single, strong, dark carina; sides divergent and nearly straight to about two-thirds distance from front, rather sharply angled before concavity in front of hind angles.

Elytron and venter of thorax and abdomen as in *similis*. Genitalia as figured; paramere with well-defined angle at tip, large cluster of 30–40 long hairs along outer part of apical blade.

Elytron: 10.8±0.97 mm (8.5–13.0). 30 spec.

FEMALE.—Similar to male; larger in size, antenna shorter. Genitalia as figured; bursa nearly trapezoidal with numerous spines compacted to extent that bursa appears sclerotized; spermathecal duct without diverticulum.

Elytron: 11.3±0.84 mm (10.8–12.6). 12 spec.

TYPE.—Holotype of *spadix:* Male, "Amer. Sept." (ZM 17035). Only specimen in type series.

DISTRIBUTION.—Eastern U.S. west to Nebraska and Arkansas.

ARKANSAS: Washington; July. FLORIDA: Manatee; March. GEORGIA: Clarke, Fulton, Habersham; April, July. ILLINOIS: Piatt, Whiteside; June. INDIANA: Clark, Lake; June, July, December. MARYLAND: Anne Arundel, Baltimore, Montgomery, Plummer's Is.; May, June. MICHIGAN: Marquette, Oceana; June, July. MONTANA: Barry; June. NEBRASKA: Washington; June. NEW JERSEY: Atlantic, Burlington, Middlesex, Ocean; May–August. NEW YORK: Erie, Queens, Suffolk; May–July. NORTH CAROLINA: Moore, Polk; May. PENNSYLVANIA: Dauphin; August. SOUTH CAROLINA: Oconee; June. TENNESSEE: Sevier; June. VIRGINIA: Gloucester, Nelson; May, June.

M. spadix is closely allied to *M. similis* but is usually larger and lighter in color, and antennal segment 4 is more slender. For positive identifications, however, it is usually necessary to examine the dissected genitalia. The male genitalia of the two species are quite dissimilar, and *spadix* males are easily recognized by the large tuft of hairs covering the whole surface of the lateral part of the gonostyle apical lobe. The female genitalia are also conspicuously different, and the densely spined bursa of *spadix* bears little resemblance to that of *similis*.

Many specimens identified by Mr. Lane and by us will be labelled as *M. abdominalis* since this name is believed to be the correct one

for *spadix*, but study of the types of *abdominalis* reveals it is an unfamiliar species which apparently does not occur in North America.

3. *Melanotus decumanus* (Erichson)

FIGURES 4*f–h*, 8*d*; PLATE 1*b*

Cratonychus decumanus Erichson, 1842, p. 104.—LeConte, 1853, p. 474.
Melanotus decumanus.—Candèze, 1860, p. 341.—Blatchley, 1910, p. 749.—Thomas, 1941, p. 258.—Severin, 1949, p. 15.—Fattig, 1951, p. 20.
Cratonychus cuneatus LeConte, 1853, p. 473.
Melanotus cuneatus.—Thomas, 1941, p. 258.
Cratonychus incertus LeConte, 1853, p. 474.
Melanotus canadensis Candèze, 1860, p. 342.—Blatchley, 1910, p. 751.—Thomas, 1941, p. 258.—Dietrich, 1945, p. 55.

MALE.—Large species, body color dark reddish brown, covered with yellowish hairs evenly distributed over body.

Head: Front coarsely punctate, most punctures hexagonal shaped, distance between punctures less than half puncture diameter, surface with broad depression anteriorly, margin strongly jutting and forming noticeable shelf above clypeus; parantennal fovea very shallow, usually teardrop shaped. Mandible without pit; palpi reddish to yellowish brown. Antenna about exceeds tip of hind angle by 1½ segments, erect male hairs dense and easily observed, average ratio of segments 2:3:4 varies from 5:10:20 to 5:8:19, segments 4 and following longer and more slender than *similis*.

Pronotum wider than long, ratio of width/length =1.2, a little flattened dorsally, punctures about same size as those on front, at center separated by distance equal to puncture diameter or less, little more dense on sides and front, oval in shape except those on anterior angles hexagonal shaped as on front; hind angles divergent, with single, strong, black carina, and often a second smaller one; sides divergent and nearly straight to about two-thirds distance from base, rather sharply angled before concavity in front of hind angles.

Elytron and venter of metathorax and abdomen as in *similis*. Genitalia as figured, paramere straight or with gently sloping sides basad of apical blade, blade with 8 hairs.

Elytron: 11.2±0.6 mm (10.0–12.4). 33 spec.

FEMALE.—Similar to male. Larger, antenna little shorter. Genitalia as figured; bursa completely devoid of spines or sometimes with patch of 5–8 small spines (like those of *similis*) on either side of bursa near base.

Elytron: 12.2±0.8 mm (10.0–14.1). 47 spec.

TYPES.—Holotype of *decumanus:* Female, "Amer. Sept." (ZM). Only specimen in type series.

Lectotype of *cuneatus:* Male, labelled with orange circle (Southern States). (MCZ). First specimen of type series selected as lectotype by authors in 1962.

Lectotype of *incertus:* Male, labelled with green circle "Middle States." (MCZ). First specimen to type series selected as lectotype by authors in 1962.

Holotype of *canadensis:* Male, "Canada" (BMNH).

DISTRIBUTION.—Eastern U.S. and Canada west to South Dakota, Colorado, and New Mexico.

ALABAMA: Mobile; May. CONNECTICUT: Fairfield, Hartford, New Haven; March, August. GEORGIA: Bibb, Clarke, Crawford, DeKalb, Fayette, Fulton, Richmond, Walton; April, June. INDIANA: Greene, Vigo; June, October. ILLINOIS: Champaign, Marshall; May, June. IOWA: Dickinson, Woodbury; July. KANSAS: Douglas, Greenwood, Leavenworth, McPherson, Reno; May, June. KENTUCKY: no data. MARYLAND: Montgomery; June. MASSACHUSETTS: Hampshire, Middlesex; June. MICHIGAN: Cheboygan; July. NEBRASKA: Cuming, Dakota, Lancaster, Lincoln, Otoe, Thomas; May, June. NEW HAMPSHIRE: Strafford; June. NEW JERSEY: Atlantic, Bergen, Essex, Monmouth, Montclair, Morris, Ocean, Passaic; June, July. NEW MEXICO: Bernalillo, Sandoval; May, June. NEW YORK: Cattaraugus, Greene, Kings, Nassau, Tompkins, Westchester; June, July. NORTH CAROLINA: Beaufort, Brunswick, Buncombe, Columbus, Duplin, Hyde, Jackson, Johnston, Montgomery, Wake; May, June. OHIO: Clark, Erie, Hamilton; May, July. PENNSYLVANIA: Delaware, Northampton, Philadelphia; June, September. RHODE ISLAND: Washington; June, July. SOUTH CAROLINA: Aiken, Dorchester, Edgefield, Florence, Oconee; May, June. SOUTH DAKOTA: Brookings, Union; June. TENNESSEE: Smith. VIRGINIA: Alexandria, Dinwiddie, Essex, Faquier, Nelson, Nottaway, Prince Edward; May, June. NOVA SCOTIA: Annapolis; June.

The large, jutting frons of *M. decumanus* is usually sufficient to distinguish this species from *M. similis, spadix,* and *castanipes;* it is variable, however, and there are specimens that have a reduced frontal margin which might cause them to be confused with the other species. The females often have a smaller margin than males. The male genitalia differ from *similis* in the gradual expansion of the paramere basad of the apical blade but can be confused with some *similis* in which the enlargement is not abrupt. The female bursa is strikingly different from that of the allied species with the complete lack of spines.

4. *Melanotus castanipes* (Paykull)

FIGURES 4*i*, 8*f;* PLATE 1*c*

Elater castanipes Paykull, 1800, p. 23.

Cratonychus castanipes.—Erichson, 1842, p. 95.

Melanotus castanipes.—Redtenbacher, 1849, p. 249.—Schwartz, 1892, p. 152 [as a synonym of *rufipes*].—Putzeys, 1908, p. 294 (larva).—Blatchley, 1910, p. 746.—Binaghi, 1939, p. 224.—Thomas, 1941, p. 257.—Dietrich, 1945, p. 54.—Severin, 1949, p. 15.—Fattig, 1951, p. 19.—Jeuniaux, 1955, p. 234.

Melanotus paradoxus Melsheimer, 1846, p. 152.
Cratonychus paradoxus.—LeConte, 1853, p. 480.
Cratonychus inaequalis LeConte, 1853, p. 476.
Melanotus inaequalis.—Leng, 1920, p. 174.—Thomas, 1941, p. 258.
Cratonychus scrobicollis LeConte, 1853, p. 476.
Melanotus scrobicollis.—Leng, 1920, p. 174.—Thomas, 1941, p. 258.—Fattig, 1951, p. 19.
Melanotus texanus Candèze, 1860, p. 351.

MALE.—Large species, body color reddish to dark reddish brown, covered with yellowish hairs evenly distributed over body.

Head: Front coarsely punctate, most punctures hexagonal shaped, distance between punctures less than half puncture diameter, surface often with shallow depression on disc, margin not protuberant, extending little beyond level of clypeus, rounded, weakened in center and when viewed from directly in front appears obliterated; parantennal fovea very shallow. Mandible without pit; palpi yellowish brown. Antenna exceeds tip of hind angle by about 3 segments, segments 2 and 3 small, much smaller than 4, ratio of 2:3:4=5:7:17.

Pronotum wider than long, punctures about same size as those of front, little deeper than in *similis*, at center separated by distance equal to puncture diameter or less, little more dense on sides and front, oval in shape except those on anterior angles hexagonal shaped as on front; hind angles divergent, with single, strong, black carina; sides markedly divergent beyond center, appear thinner than usual.

Genitalia as figured; paramere with large apical blade, side nearly straight basad of blade.

Elytron: 11.2±0.7 mm (9.9–12.6). 50 spec.

FEMALE.—Similar to male, but larger. Antennal segments 2 and 3 not as small, ratio of 2:3:4=7:9:17. Pronotum is fuller and does not have thin appearance toward margin. Genitalia as figured; bursa with numerous, long spines on basal ¾ arranged so densely to give bursa sclerotized, striated appearance, apical ¼ membranous except small patch of spines; accessory gland distinctly clavate.

Elytron: 12.7±0.7 mm (10.8–14.1). 50 spec.

TYPES.—Types of *castanipes:* 3 males, 2 females; 1 labelled with red and green tags and "213/61," others only with green tag (Riksmuseum, Stockholm). These are presumed to be Paykull's types, but no lectotype has been selected because we feel that the validity of these types may be questioned.

Lectotype of *paradoxus:* Male, no collection data (MCZ). Only specimen in type series.

Lectotype of *inaequalis:* Female, labelled with pale blue circle "Lake Superior" (MCZ). First specimen in type series selected as lectotype by authors, 1962.

Lectotype of *scrobicollis:* Male, labelled with pink circle "Middle States" (MCZ). Third specimen in type series selected as lectotype by authors in 1962. First specimen with broken antennae and second specimen, apparently male, doubtfully referred to this species.

Type of *texanus:* Female, "Texas, Jansen Coll. ex Candèze 1903, 130," (BMNH).

DISTRIBUTION.—Holarctic. Southeastern Canada, eastern U.S. west to Utah, Arizona, southern California, Mexico.

ARIZONA: Coconino, Pima; June, July. CALIFORNIA: "S. Cal." COLORADO: Larimer, "Waldo Canon"; June, July. ILLINOIS: McHenry; May. MAINE: Penobscot; June, July. MASSACHUSETTS: Suffolk; May. MICHIGAN: Alpena, Crawford, Marquette, Oakland; June, July. MINNESOTA: St. Louis. NEW HAMPSHIRE: Carroll, Cheshire, Coos; April, August. NEW MEXICO: San Miguel. NEW YORK: Cattaraugus, Cortland, Erie, Essex, Niagara, Oswego, Tompkins, Warren; March, September. NORTH CAROLINA: Wake; June. OHIO: Summit; May. PENNSYLVANIA: Carbon; June. RHODE ISLAND: Washington; August. UTAH: Juab, Utah; January, July. WISCONSIN: Dodge, Milwaukee; May, July. NOVA SCOTIA: Bridgetown; July. ONTARIO: Prince Edward; May. QUEBEC: Mt. St. Hilaire, Regaud, Deparquest, Hull, Aylmer, Hudson; May, July. MEXICO: El Salto Diego, June.

With its large size and small second and third antennal segments, the male of *castanipes* is not difficult to recognize; it is easily separable from *ignobilis* by the shape of the flagellar segments. The females are more difficult to identify, since the third antennal segment is larger and more nearly intermediate between the second and fourth, which makes it similar to *spadix* or *similis*. The weakened frontal margin, when viewed from directly in front, is the most useful external character for separating *castanipes*, but in doubtful cases only the dissected genitalia will provide a reliable answer.

M. castanipes is a widely distributed and variable species. Large series from throughout its range might show it divides into subspecies, but, from our rather limited material, we can only point out the pattern of variation we observe without applying names to any of the variants. Throughout the species there is sexual dimorphism with the females larger, the edges of the pronotum less flattened laterally, the frontal margin less jutting, and the third antennal segment longer. Specimens from the eastern United States are observably different from those in the Southwest and the Great Plains. The western specimens are smaller (male average elytron length is 10.7 mm compared to overall average elytron length of 11.2 mm), and the pronotum is more strongly flattened laterally and often more strongly divergent posteriorly. The most conspicuous variation of the western specimens is the thin, jutting frontal margin which often contrasts sharply with the flattened or rounded, obsolescent margin in eastern specimens.

These differences are more strongly marked in males than in females, but the trend is parallel in the two sexes. The distinctive genitalic characters in both the male and female, however, are constant throughout the range of the species.

Two females from Europe have been dissected and examined. No observable differences are noted between these specimens and American ones and, externally, they are similar to the eastern forms described above. The female internal genitalia is precisely as the American specimens. The bursa bears a dense patch of spines centrally and a smaller, separated patch distally. The accessory gland is enlarged, clublike apically and the spermathecal duct branches as shown in the illustration.

Specimens examined: 1 ♀, Skane, Sweden, "Stromberg Det."; I.N.H.S. 1 ♀, Germany (?), Andreas Bolter Collection; I.N.H.S.

Melanotus rufipes (Herbst) is a European species closely related to *castanipes*, and the synonymizing of the two species as proposed long ago by Schwartz (1892) would seem warranted; however, we accept the decision of recent students of the European fauna who regard the two species as distinct (Binaghi, 1939; Jeuniaux, 1955).

5. *Melanotus communis* (Gyllenhal)

FIGURES 4*j*, 9*a*,*b*; PLATE 1*d*

Elater communis Gyllenhal, 1817, p. 138.—Say, 1839, p. 184.
Perimecus communis.—Kirby, 1837, p. 148.
Cratonychus communis.—Erichson, 1842, p. 102.—LeConte, 1853, p. 477.
Melanotus communis.—Emmons, 1854, p. 88.—Candèze, 1860, p. 353.—Comstock and Slingerland, 1891, p. 262.—Blatchley, 1910, p. 750.—Hyslop, 1916, p. 5.—van Zwaluwenburg, 1922, p. 12.—Fenton, 1926, p. 502.—Thomas, 1941, p. 259.—Dietrich, 1945, p. 57.—Jewett, 1946, p. 10.—Fattig, 1951, p. 20.
Melanotus paganus Candèze, 1860, p. 359.

MALE.—Body color reddish brown, covered with white or yellow vestiture evenly distributed over body, specimens in Southwest often darker.

Head: Front coarsely punctate, punctures rounded hexagonal, separated by distance equal to less than own diameter, surface with transverse depression anteriorly, sometimes very weak or reduced to pair of shallow, anterolateral depressions, margin black or dark reddish brown, not strongly protuberant above clypeus; clypeus lightly punctate, parantennal fovea shallow, comma shaped, width of interfoveal area 1½–2 times height. Mandible without pit; palpi yellowish brown. Antenna 1 or 2 segments longer than pronotum, reddish brown, usually outer angles of flagellar segments testaceous and usually with median, dark brown, longitudinal streak on each side of flagellar segments; ratio of segments 2:3:4=4:7:9, segment 4

about 1½ times as long as maximum width; erect male hairs short and rather sparse.

Pronotum wider than long, ratio of width/length=1.22 (1.16–1.30, S.D.=0.03, 100 spec.); punctures at center usually separated by distance equal to more than own diameter, denser on margins, punctures often larger in specimens from Southwest; hind angles divergent, often with two carinae, lateral carina extending little anterior of base of hind angle, median carina, when present, shorter and weaker than lateral; side concave before hind angle.

Genitalia as figured; paramere with small indentation marking apical blade, aedeagus evenly tapering to acute apex.

Elytron: 9.0±0.5 mm (8.1–10.1). 50 spec.

FEMALE: Similar to male. Genitalia as figured; accessory gland, spermathecal duct, and diverticulum originate close together near apex of bursa, bursal spines tacklike, large, conspicuous.

Elytron: 9.0±0.7 mm (7.1–10.6 mm). 40 spec.

TYPES.—Lectotype of *communis:* Male, "Amer. Bor. ??—401/62" (Schöenherr Collection, Riksmuseum, Stockholm). First of two specimens in type series selected as lectotype by Quate, 1962.

Lectotype of *paganus:* Female, "Amer. Bor., Coll. Janson, Ex Dejean" (BMNH). First of two specimens in type series selected as lectotype by Quate, 1960.

Two females from the Zoologiska Instit., Uppsala, were sent to us when we requested the loan of *communis* types. These belong to the species *morosus* and we believe they are not the type specimens of Gyllenhal.

DISTRIBUTION.—Eastern U.S. west to South Dakota, Oklahoma, and Texas.

ALABAMA: Mobile; March. ARIZONA: Graham; August. ARKANSAS: Hempstead, Washington; April, June. CONNECTICUT: Hartford, Litchfield, Middlesex, New Haven, Tolland; (Jan.), March–November. COLORADO: Pingree Pk. (County?); August. FLORIDA: Dade, Palm Beach; May, July. GEORGIA: Fulton, Harris; June. ILLINOIS: Champaign, Cook, Gallatin, Lake, Piatt, Pike, Pope, Union, Vermilion, Wabash; March–September. INDIANA: Clark, Greene, Pulaski, Spencer, Starke, Tippecanoe; April–September. IOWA: Decatur, Henry, Scott; April–May. KANSAS: Barton, Douglas, Gray, Reno, Republic; June–July. KENTUCKY: Jefferson; March. LOUISIANA: East Baton Rouge, Saint Tammany; June. MARYLAND: Calvert, Harford, Prince Georges, Washington; February–November. MASSACHUSETTS: Essex, Franklin, Hampden, Hampshire; April–September. MICHIGAN: Kent, Monroe, Ottawa, Washtenaw; April–June. MINNESOTA: St. Louis, no date. MISSISSIPPI: George; April–May. MISSOURI: Boone, Callaway, Mississippi, Phelps, St. Louis, Stoddard; March–November. NEBRASKA: Cherry, Lancaster, Lincoln, Sarpy; April–July. NEW JERSEY: Bergen, Burleigh, Burlington, Camden, Essex, Middlesex, Morris, Ocean, Union; February–September. NEW YORK: Dutchess, Erie, Nassau,

Niagara, Orange, Rockland. Schenectady, Tompkins, Wayne, Westchester; March–December. NORTH CAROLINA: Wake (Mills River); June, September. OHIO: Athens, Franklin, Hocking, Richland; March, November. OKLAHOMA: Woodward; June. PENNSYLVANIA: Allegheny, Bucks, Philadelphia, York; March–September. SOUTH CAROLINA: Oconee; September, December. SOUTH DAKOTA: Bon Homme, Brookings, Union; June–July. TENNESSEE: Montgomery; April. TEXAS: Harrison, Gonzales; April, June. VIRGINIA: Alexandria, Canal, Fairfax, Loudoun, Nottaway, Spotsylvania; March–December. WASHINGTON, D.C.: March–September. WEST VIRGINIA: Marion; no date.

6. *Melanotus indistinctus* Quate, new species

FIGURES 4*k*, 9*f*,*g*

MALE.—Same as *communis*, but average size smaller, a little darker in color, frontal margin little wider than black border, parantennal fovea small but distinct, and pronotal punctures somewhat larger and denser. Genitalia with slender, tapering aedeagus, paramere shorter and thicker in *communis*, emargination before blade deeper and more marked, blade broader and shorter.

Elytron: Holotype 8.2 mm; paratypes 8.3±0.5 mm (7.4–9.4). 50 spec.

FEMALE.—Not clearly separable from *communis* (see discussion below).

DISTRIBUTION.—Virginia west to Kansas, Oklahoma, and Texas.

Holotype, male (USNM): Pittsfield, Pike Co., Ill., July 6, 1946, A. T. McClay.

Paratypes, 122 males (USNM, CU, ILL, U. Mo., U. Nebr., TEX AM, CAS, Lane Coll'n): ILLINOIS: same as holotype, July 5–9, 1946; same, June 24, July 1, 7, 9, 1947, B. Cadwell; La Clede, Fayette Co., July 7, 1950, Ross and Sanderson; Shawneetown, Gallatin Co., June 14, 1934, Ross and DeLong; Havana, Mason Co., July 8, 1910, at light; Harrisburg, Saline Co., June 25, 1932, Ross, Dozier, Park; Dubois, Washington Co., July 2, 1909, at light; Fox Ridge St. Pk., July 9, 1944. VIRGINIA: Holland, Nansemond Co., April 28, 1947, W. D. Fronk. KENTUCKY: no other data. MISSISSIPPI: Lincoln Co., May 18, 1938, peach tree, W. F. Turner. MISSOURI: St. Louis, August 12, 1935, June 22, 1937, USDA traps; Webster Groves, St. Louis, May 31, 1919, June 17, 1919, Satterthwait; Charleston, Mississippi Co., June 12, 1917, Satterthwait; Columbia, Boone Co., May 4, 1940, W. R. Enns; same, June 15, 1907, R. H. Wolcott; same, July 14, 1941, H. E. Brown; Lathrop, Clinton Co., July 3, 1948, E. C. Becker. LOUISIANA: Shreveport, Caddo Co., June 2, 1949, J. H. Robinson; Olivier, Iberia Co., April 1904, E. S. G. Titus; Leesville, Vernon Co., May 1948, H. S. Fitch. ARKANSAS: Clark Co., May 12, 1939, M. W. Sanderson; Hope, Hempstead Co., April 30, 1925, April 23, 1926, May 17, 1926, July 5, 1926, June 25, 1931, L. Knobel; Hempstead Co., May 8, 1939, Sanderson and Van Dyke; Miller Co., May 8, 1939, Sanderson; Fayetteville, Washington Co., May 31, 1942, at light, Sanderson; Washington Co., May 30, 1938, Sanderson and C. Cameron. KANSAS: Medora, Reno Co., July 3; same, July 14, 1926, J. W. McColloch. OKLAHOMA: Muse, LeFlore Co., May 7, 1939, Sanderson. TEXAS: Luling, Gonzales Co., May 2, 1953, B. J. Adelson; Tyler, Smith Co., May 20, 1942, L. D. Christenson, Bronson, Sabine Co., May 30, 1945, J. H. Robinson; Tyler, Smith Co., March 24, 1939, L. S. Jones. "So. McAlester, Ind. T., June 11, Wickham." Cherokee Co., May 5, 1952, June 1,

1952, light trap; Smith Co., April 6, 14, 1956, April 24, 1937, May 2, 1956; Nacogdoches, Nacogdoches Co., March 28, 1940.

Other specimens: TENNESSEE: Milan, Gibson Co., June 2. TEXAS: Orange, Orange Co., June 20, 1949, W. C. Stehr.

Only from Pittsfield, Ill., do we have a good series of females associated with males. In this series there appear to be two types: one is indistinguishable from *communis*, and the other has large bursa spines; the spermathecal duct branches farther from the bursa, and the bursa surface is coarsely reticulate. It is possible that the second type represents the female of *indistinctus*, but, since the evidence is not unequivocal, we have not definitely identified any of the females nor included them in the type series.

This species will be found in some collections identified by Lane as "species 20."

7. *Melanotus dietrichi* Quate, new species

FIGURES 4*l*, 9*d*,*e*

Melanotus communis var. A.—Dietrich, 1945, p. 57.—Severin, 1949, p. 16.

MALE.—Same as *communis* in all features except male genitalia. Male genitalia with very narrow aedeagus and paramere, paramere with elongate blade at tip and several hairs.

Elytron: Holotype 8.7 mm; paratypes 9.9+0.4 mm (8.8–10.6). 60 spec.

FEMALE.—Unknown (or inseparable from *communis*).

DISTRIBUTION.—Connecticut to Pennsylvania, west to Iowa.

Holotype, male (CU): Fairmont, Marion Co., W. Va., March 24, 1930, P. N. Musgrave.

Paratypes, 67 males (USNM, CU, ILL, CIS, U. Mo., Ohio U., Lane Coll'n): NEW YORK: Poughkeepsie, Dutchess Co., June 19, 1933, P. J. Chapman; Staatsburg, Dutchess Co., June 23, 1934, H. Dietrich; Rhinebeck, Dutchess Co., Nov. 5, 1934, Dietrich; Yonkers, Westchester Co., Nov. 21, 1940; Kensico,? Co., April 27, 1935, J. A. Angell. NEW JERSEY: Teaneck, Bergen Co., October 1923; Brookdale, Essex Co., April 24, 1916, E. R. Kolmbach. CONNECTICUT: New Canaan, Fairfield Co., Sept. 24, 1919, M. P. Zappe. WASHINGTON, D.C.: Rock Creek, Dec. 30, 1906; same, April 21, 1907, C. E. Burden. MARYLAND: Cumberland, Allegany Co., Nov. 4, 1915, W. F. Pennington; Woliville,? Co., May 2, 1913. WEST VIRGINIA: same as holotype. OHIO: Columbus, H. H. P. Severin; Athens, Athens Co., Sept. 25, 1949, P. J. Spangler; same, June 26, 1935, A. Sintic; same, April, June, Oct., Nov., Dec., W. C. Stehr; Ames Twp., Athens Co., April 24, 1934, Stehr; Delaware Co., April 1921, D. J. & J. N. Knull. INDIANA: Beverly Shores, Porter Co., Aug. 6, 1932. ILLINOIS: Summit, Cook Co., April 17, 1908; Vermilion Co., April 25, 1926, K. F. Auden. IOWA: Ames, Story Co., June 19, 1926; same, July 2, 1931, W. C. Stehr. LOUISIANA: Baton Rouge, June 20, 1916, T. H. Jones.

Other specimens: CONNECTICUT: Middlesex Co., April. NEW YORK: Columbia Co., June, Queens Co. PENNSYLVANIA: Westmoreland Co., June, July. MARYLAND: Allegany Co., Nov. OHIO: Athens Co., June, July. WEST

VIRGINIA: Fayette Co., TENNESSEE: Knox Co., May. IOWA: Henry Co., April.

8. *Melanotus miscellus* Quate, new species

FIGURES 4*n*, 9*c*

Melanotus communis var. B.—Dietrich, 1945, p. 57.—Severin, 1949, p. 16.

MALE.—Same as *communis*, except averages little smaller in size, often darker reddish brown, and genitalia differ in being shorter, aedeagus wider, paramere thicker, and with broader and shorter apical blade, blade with dense cluster of hairs. Ratio of pronotal width/length=1.2 (1.1–1.3).

Elytron, holotype 8.9 mm; paratypes 8.5±0.4 mm (7.6–9.7). 40 spec.

FEMALE.—Similar to male except sexual differences. Genitalia as figured; differs from *communis* in that spines of bursa nearer apex, spermathecal duct, spermathecal duct diverticulum and accessory gland arise independently from bursa, accessory gland base far removed from base of spermathecal duct.

Elytron: Allotype 8.7 mm; paratypes, 8.5±0.4 mm (7.8–9.5). 19 spec.

DISTRIBUTION.—Ontario, eastern U.S. west to Illinois.

Holotype, male and allotype, female (USNM): Chapel Hill, Orange Co., N.C., Feb. 3, 1935.

Paratypes, 52 males, 41 females (USNM, CU, ILL, NU, CAS): same data as holotype and allotype. MARYLAND: Sparrows Pt., Baltimore, July 3, 1932, J. W. Green; Edgewood, Harford Co., Nov. 3, 1918, H. Dietrich. VIRGINIA: Pennington Gap, Lee Co., Hubbard and Schwarz. FLORIDA: Apalachicola, Franklin Co., *Taxodium distishum*, W. F. Fiske. GEORGIA: Savannah, Chatham Co., March 9, 1940, Van Dyke. MISSISSIPPI: Lucedale, George Co., Feb. 27, 1931, March 22, 1932, H. Dietrich; New Augusta, Perry Co., Feb. 12, 1931, H. Dietrich. INDIANA: LaPorte Co., June 9, 1953, wheat, K. Pruess. ILLINOIS: Homer, Champaign Co., March 30, 1907, Hart and Hood; Mahomet, Champaign Co., Sept. 13, 1933, H. H. Ross; St. Joseph, Champaign Co., May 4, 1913; Dec. 24, 1944, J. L. C. Rapp; Riverside Wds., Cook Co., Sept. 13, 1949, W. Tietz; Western Springs, Cook Co., June 16, 1949, Ross and Stannard; Willow Springs, Cook Co., May 12, 1921; Havana, Mason Co., July 11, 1948, Sanderson, Stannard, Becker; White Heath, Piatt Co., March 20, 1942, Ross and Riegel; April 6, 1926, K. F. Auden; Allendale, Wabash Co., April 30, 1950, Smith and Stannard; Benson, Woodford Co., Oct. 11, 1933, Frison and Ross. ONTARIO: Prince Edward Co., April 16, June 12, July 15, 1922.

This species appears intermediate between *similis* and *communis*. External characters of color and pronotal punctures resemble *communis*, but the male genitalia more closely resemble *similis;* the position of spines of the female bursa is as in *similis*, but the shape of the spines is like that of *communis*. The genitalia structures, however, are distinct and although not easily recognized, seem constant. The larvae, according to Lane (in litt.), are also distinctive.

This species will be found in some collections identified by Lane as "species 2."

9. *Melanotus verberans* (LeConte)

FIGURES 4*m*, 9*i*; PLATE 1*e*

Cratonychus verberans LeConte, 1853, p. 478.
Melanotus verberans.—Candèze, 1860, p. 356.—Blatchley, 1910, p. 753.—Thomas, 1941, p. 260.

MALE.—Same as *communis*, except generally smaller in size and usually reddish brown, but some specimens darker, antenna and thorax usually concolorous, erect male hairs in antenna dense and conspicuous, with smaller and sparser pronotal punctures, genitalia with aedeagus nearly parallel sided and abruptly tapering to apex, paramere rather broad and with little curvature basad of apical blade. Ratio of pronotal width/length=1.2 (1.1–1.3).

Elytron: 7.7±0.45 mm (6.9–8.3). 9 spec.

FEMALE.—Similar to male except sexual differences. Genitalia as figured; differs from *communis* in that apex of bursa more bulbous and truncate, spermathecal duct diverticulum branches at or near base of duct.

Elytron: 6.8–7.4 mm.

TYPES.—Lectotype of *verberans:* Male, labelled with pink circle "Md." (MCZ). Only specimen now in type series, selected as lectotype by authors in 1962; location of second type unknown.

DISTRIBUTION.—Maryland to Florida and west to South Dakota and Texas.

ALABAMA: Locality?; January. ARKANSAS: Washington; May. FLORIDA: Pinellas; March, May. GEORGIA: Ribb, Peach; April, June. ILLINOIS: Mason; July. INDIANA: Tippecanoe; April. KANSAS: No data. MARYLAND: Baltimore; July. MISSISSIPPI: Forrest, George; January, April. NEBRASKA: Lancaster; May. NEW JERSEY: Middlesex; April. NEW YORK: Essex, Niagara; May, November. NORTH CAROLINA: Duplin, Moore, Orange, Wake, Wayne; April, May, October. OHIO: Athens; November. SOUTH CAROLINA: Bamberg, Oconee; May, July, December. SOUTH DAKOTA: Bon Homme; June. TEXAS: Bowie, Victoria; March. VIRGINIA: Fairfax; April.

10. *Melanotus emissus* (LeConte)

FIGURES 4*o*, 9*k*; PLATE 1*h*

Cratonychus emissus LeConte, 1853, p. 478.
Melanotus emissus.—Candèze, 1860, p. 372.—Thomas, 1941, p. 260.

MALE.—Similar to *verberans;* antenna reddish brown and lighter than rest of body, which is generally dark reddish brown, erect male hairs of antenna dense and conspicuous, hind angles of pronotum sometimes lighter in color than rest of pronotum, pronotal punctures

denser. Genitalia differ in being shorter, aedeagus wider (but not as wide as *verberans*), apical blade broader, and bearing four bristles.

Elytron: 6.6±0.6 mm (5.9–8.4). 32 spec.

FEMALE.—Not positively identified (see discussion below).

TYPE.—Holotype of *emissus:* Male, labelled with orange circle "Ga." (MCZ). Damaged specimen only one in type series.

DISTRIBUTION.—Maryland and North Carolina west to South Dakota and Kansas.

ALABAMA: Mobile; April. IOWA: Story; June. KANSAS: Douglas; no date. MARYLAND: Baltimore; July. NEBRASKA: Lancaster; July. NORTH CAROLINA: Bladen, New Hanover, Pender; May. SOUTH DAKOTA: Union, Yankton; June, July. VIRGINIA: Elizabeth City; May.

In the material studied there are two different females associated with the males on the basis of similarity in appearance and locality. One seems to be the same as the female of *verberans* and the other a distinct form (fig. 9*k*). The latter, from Ash, N.C., is tentatively assigned to *emissus* but not with certainty. This also poses the question as to the proper association of sexes in *verberans*, but that cannot be answered at this time.

11. *Melanotus lanei* Quate, new species

FIGURES 5*a*, 9*h*; PLATE 1*f*

MALE.—Same as *communis*, but smaller in size, generally darker in color; antenna as in *communis*, ratio of segments 2:3:4=5:9:12, segment 4 about 1½ times as long as wide; pronotum narrower, ratio of width/length=1.0–1.1, vestiture thicker, pronotal punctures smaller and denser; genitalia shorter, aedeagus evenly tapering from base to apex.

Elytron: Holotype 6.6 mm; paratypes 6.7±0.6 mm (5.9–8.2). 17 spec.

FEMALE.—Same as male, but larger. Genitalia as *communis* with diverticulum branching from spermathecal duct, differs from *communis* in that bursa has fewer spines, from 15 to 20 (allotype with 17).

Elytron: Allotype 8.0 mm; paratypes 7.6±0.5 mm (6.7–8.7). 21 spec.

DISTRIBUTION.—Pennsylvania south to Florida and west to South Dakota and Kansas.

Holotype, male, allotype, female (USNM): Lincoln, Nebraska, July 2, 1957, black light trap.

Paratypes, 9 males, 13 females (USNM, NU, CAS, MCL). Washington, D.C., May 22, Hubbard and Schwarz. PENNSYLVANIA: Darby, Delaware Co., July 4. IOWA Ames, Story Co., June 6, 1931, J. F. Glawe; same, June 10, 1925. SOUTH DAKOTA: Brookings, June 22, 1943, H. C. Severin; Kimball, Brule Co., June 17, 1947, Severin; Turner Co., June 15, 1929, Severin. NEBRASKA: Lincoln, June 27, 1909, F. H. Shoemaker; Fairmont, Fillmore Co., June 17, 1914, G. W. Denning;

Bradshaw, York Co., July 9, 1917, *Amaranthus*, E. J. Yates. KANSAS: Douglas Co., J. C. Bridwell; Topeka, Popenoe. ARKANSAS: Hope, Hempstead Co., May 19, 1931, June 11, 1954, J. W. Green; "Vinita, Ind. T., June 7–8, '99, Wickham." FLORIDA: Lake City, Columbia Co., 1933, Wickham.

It is a pleasure to dedicate this species to M. C. Lane in recognition of his long and diligent studies of the Elateridae that are greatly advancing the taxonomic knowledge of this large family.

12. *Melanotus pilosus* Blatchley

FIGURES 5*b*, 9*l*; PLATE 1*g*

Melanotus pilosus Blatchley, 1910, p. 751.—Fenton, 1926, p. 502.—Blatchley, 1930, p. 35.—Dietrich, 1945, p. 59.

MALE.—Similar to *communis*, but smaller and more densely covered with whitish or gray vestiture; antenna with erect hairs very dense, segment 3 short, ratio of segments 2:3:4=4:7:12, segment 4 broad, twice as long as wide; frontal margin very thin, upturned and nearly straight on center rather than rounded; pronotal punctures smaller and denser than *communis;* paramere with short, broad apical blade and deep indentation basad of blade.

Elytron: 6.9±0.4 mm (6.4–8.0). 24 spec.

FEMALE.—Similar to male, bursa small, with about 30 spines, spines with large bases; spermathecal duct and diverticulum arising separately from bursa; accessory gland far basad of spermathecal duct.

Elytron: 6.9 mm (6.5–7.2).

TYPE.—Holotype: Male, Posey Co., Ind., June 6, 1904, Blatchley (PU).

DISTRIBUTION.—Central U.S.

ARKANSAS: Washington; May. ILLINOIS: Wabash; June. INDIANA: Bartholomew; Tippecanoe; June. IOWA: Linn; June. KANSAS: Riley, Sedgwick; June. MONTANA: Big Springs St. Pk.; June. NEBRASKA: Antelope, Chase, Custer, Keith, Lancaster, Lincoln, Scotts Bluff; June. OKLAHOMA: Hayes; July.

13. *Melanotus opacicollis* LeConte

FIGURES 5*d*,*e*, 9*j*; PLATE 1*i*

Melanotus opacicollis LeConte, 1866, p. 390.—Blatchley, 1910, p. 751.

MALE.—Similar to *communis* but vestiture of pronotum very dense, velvety, pronotal punctures numerous, dense, and so close together as to appear granulose; frontal margin thin and protruding. Genitalia with evenly tapering aedeagus, paramere with marked indentation below blade, slightly sinuous before center.

Elytron: 7.2 mm (6.9–7.5). 4 spec.

FEMALE.—Similar to male. Bursa with 6 to 11 spines, much less numerous than *communis*, spermathecal duct diverticulum branches from spermathecal duct at distance clearly distal of base of duct.

Elytron: 8.0±0.5 mm (7.1–8.8). 18 spec.

TYPES.—Lectotype: Female, "Ill./477" (MCZ). First specimen in type series selected as lectotype by authors in 1962.

DISTRIBUTION.—Indiana and Mississippi, west to Kansas.

ARKANSAS: Hempstead; May. ILLINOIS: Greene, Marion, Rock Is.; May, June. INDIANA: Owen; July. IOWA: no other data. KANSAS: Linn, Montgomery, Riley; June. LOUISIANA; ? Co.; May. MISSISSIPPI: George, Greene; May. MONTANA: Boone, Callaway, Clinton, Jackson; May, July.

14. *Melanotus clandestinus* (Erichson)

FIGURE 5*f*

Cratonychus clandestinus Erichson, 1842, p. 112.—LeConte, 1853, p. 474.
Melanotus clandestinus.—Candèze, 1860, p. 343.—Thomas, 1941, p. 258.—Dietrich, 1945, p. 55.—Fattig, 1951, p. 20.
Melanotus peninsularis Candèze, 1889, p. 46.—Fattig, 1951, p. 22. [New synonymy.]
Melanotus perplexus Blatchley, 1920, p. 46; 1930, p. 44.—Fattig, 1951, p. 22.

MALE.—Body color reddish brown, head and pronotum usually darker than appendages and elytra, covered with white (sometimes yellowish) vestiture evenly distributed over body.

Head: Front with prominent anterior transverse depression, margin strongly protuberant above clypeus, a little angulate and blunt across center when viewed from above; parantennal fovea obsolescent, nasale not at all developed. Mandible without pit. Antenna exceeds pronotum by 1–1½ segments, ratio of segments 2:3:4=2:2:7, segment 4 about 1½ as long as maximum width; erect male hairs long and very dense.

Pronotum about as long as wide (variable and apparently Texas specimens usually narrower), punctures very dense and subequal to those on front, vestiture little finer than on elytra; sides rounded, with slight concavity at base of hind angles; hind angle subparallel, each with single carina extending slightly beyond base of hind angle.

Genitalia as figured; paramere without apical blade.

Elytron: 5.9±0.5 mm (5.0–6.9). 47 spec.

FEMALE.—Unknown to us.

TYPES.—Lectotype of *clandestinus:* Male, "Amer. Sept." No. 17056 (ZM). Selected by Quate, 1960. One other specimen in type series.

Lectotype of *peninsularis:* Male, "Florida, ex. coll. Morrison" (Roy. Mus. Nat. Hist., Brussels). Selected by Quate, 1960. Eight other males in type series.

Holotype of *perplexus:* Male, Dunedin, Fla., July 5, 1915, W.S.B. (PU).

DISTRIBUTION.—New Jersey south to Florida and west to Texas.

ALABAMA: Mobile; July. FLORIDA: Highlands, Hillsborough, Lee, Levy, Palm Beach, Pinellas, Suwannee, Volusia; May, July. MISSISSIPPI: George, Jackson, Pearl River; June. NEW JERSEY: Atlantic, Burlington, Cape May, Ocean; June, August. NORTH CAROLINA: Columbus, Johnston, Moore; June, July. SOUTH CAROLINA: Charleston; May. TEXAS: Bexar; July.

M. clandestinus is one of the few, small species with the elytra less than 7 mm. It is easily recognized by the dense pronotal punctures, small third antennal segment, lack of parantennal fovea and mandibular pit, in addition to the small size.

15. *Melanotus ignobilis* Melsheimer

FIGURES 5*g*, 10*a*

Melanotus ignobilis Melsheimer, 1846, p. 152.—Candèze, 1860, p. 371.—Blatchley, 1910, p. 746.—Thomas, 1941, p. 258.—Dietrich, 1945, p. 55.—Jewett, 1946, p. 9.—Severin, 1949, p. 16.

Cratonychus ignobilis.—LeConte, 1853, p. 474.

Cratonychus secretus LeConte, 1853, p. 474. [New synonymy.]

Melanotus secretus.—Candèze, 1860, p. 344.—Thomas, 1941, p. 258.—Deen and Cuthbert, 1955, p. 193.—Fattig, 1951, p. 20.

MALE.—Body color dark reddish brown, but some specimens lighter, covered with yellowish vestiture evenly distributed over body.

Head: Front with shallow anterior transverse depression, margin very narrow, not strongly protuberant above clypeus, evenly rounded or anteriorly flattened when viewed from above; parantennal fovea small and shallow, nasale flattened, width usually twice height. Mandible without pit. Antenna exceeds tip of hind angle by 1–2 segments, largely testaceous with reddish-brown streak on either side, lighter in color than rest of body; segments 2 and 3 subequal, ratio of 2:3:4=2:3:6, flagellar segments nearly quadrangular; segment 4 about twice as long as maximum width; erect male hairs short but dense.

Pronotum usually wider than long, ratio of width/length=1.0–1.2; punctures at center usually separated by distance equal to less than own diameter, subequal to those on front, denser on margins; sides of pronotum rounded with slight concavity at base of hind angles, hind angles subparallel with one strong carina extending well cephalad of base. Genitalia as figured; paramere without apical blade.

Elytron: 7.2 mm (5.2–9.3). 13 spec.

FEMALE.—Antenna short of pronotal base by about 1 segment; segment 3 about 1½ times 2, but about ½ times 4; internal genitalia as figured, bursa with 3 groups of dense, setiform spines near apex; accessory gland short and clavate, spermathecal duct very short, diverticulum arising near center of duct.

Elytron: 7.6 mm (5.2–10.0). 24 spec.

TYPES.—Lectotype of *ignobilis*: Male, no data (MCZ). Unlabelled specimen in LeConte Collection, assumed to be type, agrees with our interpretation of the species; to forestall possible confusion, specimen selected as lectotype by authors in 1962.

Lectotype of *secretus*: Male, labelled with orange circle "Southern States" (MCZ 2510). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—New York south to Florida and west to South Dakota and Texas.

ALABAMA: Colbert, Mobile; May, June. ARKANSAS: Washington; June, July. FLORIDA: Highlands, Alachua, Putnam, Volusia; April, May. GEORGIA: Charlton, Fulton; July. ILLINOIS: Marshall, Putnam; June, July. INDIANA: Clark; June. LOUISIANA: Madison; June, July. MISSISSIPPI: Greene, Jackson, Perry; May, July. MONTANA: Phelps, St. Louis; June. NEBRASKA: Lancaster; July. NEW JERSEY: Ocean; June, July. NEW YORK: Niagara, Tompkins; July. NORTH CAROLINA: Wake; June. PENNSYLVANIA: Dauphin; June. SOUTH CAROLINA: Charleston, Oconee; March, July. SOUTH DAKOTA: Brookings; July. TENNESSEE: Morgan; June, August. TEXAS: McCulloch; July.

M. ignobilis is a distinctive species easily recognized by the short third antennal segment, quadrate yellowish flagellar segments, lack of mandibular pit, and dense pronotal punctures. The female internal genitalia are quite different from any other North American *Melanotus*, and the male genitalia are also markedly different from other species.

We can find no significant differences between *secretus* and *ignobilis*. The former name was applied to smaller specimens of *ignobilis* which often have the prothorax as long as wide and are usually lighter in color. The male and female genitalia of these smaller, lighter colored specimens do not differ from *ignobilis*, and we consider them as a part of the variation range of that species; hence, *secretus* is synonymized with *ignobilis*.

The *americanus* Group

(Mandible with pit)

16. *Melanotus depressus* (Melsheimer)

FIGURES 5*i*, 10*b*; PLATE 1*j*

Ctenonychus depressus Melsheimer, 1846, p. 151.
Cratonychus depressus.—LeConte, 1853, p. 475.
Melanotus depressus.—Candèze, 1860, p. 345.—Blatchley, 1910, p. 755.—Thomas, 1941, p. 258.—Dietrich, 1945, p. 55.—Fattig, 1951, p. 20.
Ctenonychus parumpunctatus Melsheimer, 1846, p. 151.
Cratonychus parumpunctatus.—LeConte, 1853, p. 478.
Melanotus parumpunctatus.—Candèze, 1860, p. 355.—Blatchley, 1910, p. 754.—Thomas, 1941, p. 260.—Dietrich, 1945, p. 57.—Fattig, 1951, p. 21.

Melanotus divarcarinus Blatchley, 1910, p. 754.—Thomas, 1941, p. 259.—Dietrich, 1945, p. 56.—Severin, 1949, p. 16.—Deen and Cuthbert, 1955, p. 193. [New synonymy.]

Melanotus lixus Blatchley, 1910, p. 754. [New synonymy.]

MALE.—Body color dark reddish brown, covered with white or yellow hairs evenly distributed over body.

Head: Front with pair of shallow anterolateral depressions not strongly protuberant above clypeus, evenly rounded or a little angulate and flattened when viewed from above, parantennal fovea crescent shaped, small, but moderately deep and well defined; nasale obsolescent. Mandible with shallow, slitlike pit. Antenna exceeds tip of hind angle by 1 to 1½ segments; reddish brown, ratio of segments 2:3:4=3:5:6, segment 4 about twice as long as maximum width; erect male hairs short but dense.

Pronotum wider than long; punctures at center usually separated by distance equal to little less or little more than own diameter, equal to or little smaller than those on front; sides of pronotum straight behind small anterior curvature, divergent posteriorly; hind angles subparallel, strong carina extending cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 8.7±0.6 mm (6.5–10.2). 85 spec.

FEMALE.—Similar to male. Pronotum with sides often more strongly divergent; antenna exceeds pronotum by ½–1 segment; internal genitalia as figured, bursa long and coiled in loop, with scattered, peglike spines nearly throughout entire length, accessory gland originates near base, clavate, spermathecal duct branches near base.

Elytron: 9.3±0.7 mm (8.2–10.2). 44 spec.

TYPES.—Lectotype of *depressus:* Male, labelled with red label "PA." (MCZ). First species of type series selected as lectotype by authors in 1962.

Lectotype of *parumpunctatus:* Female, labelled with red label "Pa." (MCZ). First specimen of type series selected as lectotype by authors in 1962. Second specimen is *ignobilis*.

Holotype of *divarcarinus:* Male, Posey Co., Ind., June 2, 1909, W. S. B. (PU).

Holotype of *lixus:* Female, Posey Co., Ind., July 6, 1912, W. S. B. (PU).

DISTRIBUTION.—Connecticut to North Carolina, west to Nebraska and Texas.

ARKANSAS: Benton, Hempstead, Pike, Washington; May, July. CONNECTICUT: Fairfield, New Hampshire; June. GEORGIA: Catoosa, Fulton, Gwinnett, Lumpkin, Moran, White, Worth; May, July. ILLINOIS: Champaign, Clay, Jackson, Johnson, Kane, Marion, McLean, Peoria, Pope, Putnam, Rock Island,

Scott, Union, Vermilion, Washington; April, July. INDIANA: Spencer, Tippecanoe; June. IOWA: Henry, Story; June, August. KANSAS: Chautauqua, Cowley, Douglas, Miami, Montgomery, Riley; May, June. KENTUCKY: Jefferson; June. LOUISIANA: Madison; June. MARYLAND: Anne Arundel, Washington; June, July. MISSISSIPPI: George, Greene; April, May. MONTANA: Calloway, Clinton, Jefferson, Lawrence, St. Louis, Webster; April, July. NEBRASKA: Cass, Dakota, Lancaster; June. NEW JERSEY: Lakehurst, Morris, Ocean, Warren; June, August. NEW YORK: Dutchess, Essex, Seneca, Tompkins; May, July. NORTH CAROLINA: Guilford; June. OHIO: Clifton, Delaware, Erie, Franklin, Greene, Hocking, Pickaway, Ross; May, July. OKLAHOMA: Payne, Sequoyah; July. PENNSYLVANIA: Adams, Allegheny, Northampton, Philadelphia; May, July. TENNESSEE: Sevier; June. TEXAS: Bexar, Brazos, Brewster, Dallas, Kerr, Madison, Val Verde; April, July. VIRGINIA: Fairfax, Loudoun; May, July. WASHINGTON, D.C.: June. WEST VIRGINIA: Greenbrier; July.

Melanotus depressus is subject to considerable variation. Most conspicuous is the range in overall size. The variation in elytron length from 6.5–10.2 mm is about as large as any North American *Melanotus*. There appears to exist a cline in the males with size of the elytron diminishing to the west and south, as shown in the following chart. Curiously, the female does not appear to vary in the same way.

Variation in elytron length of *M. depressus* (average length in mm):

East Coast to Indiana		*Arkansas, Illinois*	*Missouri*	*Kansas*	*Nebraska*	*Texas*
♂	♀	♂	♀	♂	♀	♂
9.3	9.1	8.8	9.3	8.5	9.3	7.9

Nonclinal variation exists in the size of the parantennal fovea and mandibular pit. The pronotal punctures vary in size and density but are almost always as large as those on the front, which are larger than in *morosus*, and never as compact as in *cribulosus*. The sides of the pronotum are usually markedly divergent and are a useful feature in identifying the species when one is familiar with it. Few specimens have the sides subparallel and lack the characteristic wedge shape.

Other than a broader than usual aedeagus seen in some northern specimens, the male genitalia are constant. The female genitalia also show little variation and are characteristic of the species. We have found the genitalia to be reliable features of identification, and dissected specimens can be identified positively with little difficulty.

The bulk of specimens of the "americanus group" which we have seen belong to either *morosus* or *depressus*. We have dissected a large number of specimens to verify our identifications. We concluded that there are only two species in this section of the genus. We can find nothing to support the recognition of the third species. The type of *parumpunctatus* appears to us to be *depressus*, and it is within

the size range of that species. *M. depressus* has page priority over *parumpunctatus* and is the preferred name.

17. *Melanotus morosus* Candèze

FIGURES 5*h*, 10*e*

Cratonychus longulus LeConte, 1853, p. 480. [Not LeConte, 1853, p. 473.]
Melanotus morosus Candèze, 1860, p. 346.—Fattig, 1951, p. 22.
Melanotus debilis Blatchley, 1910, p. 754; 1930, p. 36. [New synonymy.]
Melanotus simulans Blatchley, 1927, p. 140; 1930, p. 48.—Fattig, 1951, p. 22.

MALE.—Body color reddish brown, covered with white hairs, evenly distributed over body.

Head: Front with shallow or no anterior depression, margin not strongly protuberant above clypeus, evenly rounded or flattened anteriorly; parantennal fovea moderately large and deep, circular; nasale about 1½ times as wide as high. Mandible with deep teardrop-shaped pit; palpus light reddish brown. Antenna exceeds tip of hind angle by 1–2 segments, reddish brown, ratio of segments 2:3:4=3:5:6, segment 4 about twice as long as maximum width; erect male hairs short but dense and easily seen.

Pronotum wider than long, ratio of width/length=1.04–1.18; punctures at center usually separated by distance equal to more than own diameter, smaller than punctures on front; sides of pronotum usually straight behind anterior curvature and subparallel, but often rounded with concavity at base of hind angles; hind angles slightly divergent, carina usually extending cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 7.8±0.6 mm (6.3–8.8). 40 spec.

FEMALE.—Antenna extends to or beyond base of pronotum by 1 segment; genitalia as figured, bursa with very dense, shaggy appearing, quadrate patch of setiform spines and few peglike spines on apical extension, accessory gland very slender, spermathecal duct branches near center.

Elytron: 8.1±0.6 mm (7.0–9.0). 20 spec.

TYPES.—Lectotype of *longulus:* Male, labelled with orange circle "Southern States" (MCZ 2524). First specimen of type series selected as lectotype by authors in 1962. Second and 3rd specimens not true types, labelled "Tex."; 4th specimen apparently *infaustus*.

Holotype of *debilis:* Female, Marshall Co., Ind., June 26, 1904, W.S.B. (PU).

Lectotype of *simulans:* Male, Dunedin, Fla., Mar. 15, 1918, W.S.B. (PU).

In the Institut Royal des Science Naturelles, Brussels, there is a male from Iowa City, Iowa, labelled as the type of *morosus*. In the British Museum (Natural History) there is another female from Georgia labelled as the type of *morosus*. Neither of these specimens

are true types, since *morosus* is a substitute name for the secondary homonym *longulus*, and the types of *morosus* Candèze are those selected by LeConte for *longulus* (1853, p. 480, not 1853, p. 473).

DISTRIBUTION.—Quebec to Florida and west to Nebraska and Texas.

ALABAMA: Mobile; June. ARKANSAS: Clark, Hempstead, Lawrence; April, June. CONNECTICUT: Tolland; May. FLORIDA: Manatee, Osceola, Pinellas; March. GEORGIA: Catoosa, Clarke, Cobb, Fulton, Hall, Rabun, Seminole, Thomas; March, June. ILLINOIS: Champaign, Cook, Knox, Putnam, Scott, Washington; May, July (Nov.). MARYLAND: Anne Arundel, Baltimore, Harford, Prince Georges; June, October. MASSACHUSETTS: Barnstable, Middlesex, Nantucket, Worcester; May, July. MISSISSIPPI: George, Greene, Harrison, Lamar; April, May. MONTANA: Jefferson, Lawrence, St. Louis; April, July. NEBRASKA: Douglas; June. NEW HAMPSHIRE: Carroll; July. NEW JERSEY: Atlantic, Camden, Ocean; May, August. NEW YORK: Orange, Suffolk, Tompkins, Washington; June, August. NORTH CAROLINA: Buncombe, Duplin, Hyde, Moore, Sampson, Swain, Wake, Wayne; April, July. OHIO: Adams, Delaware, Fairfield, Franklin, Greene, Hocking, Scioto; June, August. PENNSYLVANIA: Allegheny, Indiana, Monroe, Northampton, Philadelphia; April, July. SOUTH CAROLINA: Oconee; April. TENNESSEE: Carter, Sevier; June, September. TEXAS: Bastrop; April. VIRGINIA: Fairfax, Fauquier, Prince Edward; May. WASHINGTON, D.C.: April, June. ONTARIO: "Go Home Bay"; June. QUEBEC: Windsor Co.; July.

M. morosus is most likely to be confused with *depressus*. In general, *morosus* may be separated from that species by the small pronotal punctures, subparallel sides of the pronotum with pronounced anterior curve, and a more slender, jutting frontal margin. Less frequently, *morosus* is lighter in color than *depressus*. Typical specimens are not difficult to identify when one is familiar with the characters, but small variations (artificial or natural) make it necessary to dissect the genitalia for positive identification. The thick mat of spines in the bursa easily identifies the females. The male genitalia are characterized by the angulate paramere, rather than evenly rounded as in *depressus*, the moderately dense hairs at the apex of the paramere, and the rather broad, tapering aedeagus.

Specimens from Florida are usually smaller and the pronotal width/length ratio is more variable, but they do not seem to differ significantly from other *morosus*. *M. simulans* is regarded as a synonym of *morosus*.

18. *Melanotus cribulosus* (LeConte)

FIGURES 5*j*, 10*d*

Cratonychus cribulosus LeConte, 1853, p. 478.

Melanotus cribulosus.—Candèze, 1860, p. 357.—Hyslop, 1915, p. 17.—Thomas, 1941, p. 260.—Severin, 1949, p. 17.—Srivastava, 1958, p. 87.

MALE.—Body color reddish brown, covered with fairly dense whitish hairs evenly distributed over body.

Head: Front with shallow depression, margin not strongly protuberant above clypeus, rounded to flat when viewed from above; parantennal fovea small, but well defined; nasale obsolescent. Mandible with pit variable from ovoid to slit shaped. Antenna exceeds tip of hind angle by ⅓ to 1⅓ segments, reddish brown, ratio of segments 2:3:4=2.5:4:5, segment 4 about 1½ times as long as maximum width; erect male hairs very short and inconspicuous.

Pronotum wider than long, ratio of width/length=1.05–1.13; punctures at center usually separated by distance equal to less than own diameter, as large as those on front; sides of pronotum mostly straight behind moderate anterior curvature, with slight concavity at base of hind angles; hind angles divergent, carina extending cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 7.5±0.4 mm (6.4–8.5). 24 spec.

FEMALE.—Similar to male, except antenna slightly shorter in comparison to pronotum; genitalia as figured, bursa with few naillike spines with large bases, accessory gland short and clavate, spermathecal duct branches near base.

Elytron: 7.2–7.3 mm.

TYPES.—Lectotype of *cribulosus:* Male, labelled with green circle "Nebr. Terr." (MCZ 2519). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—Central U.S.

ILLINOIS: Champaign, Kane, Mason, McHenry, Warren; June, July. KANSAS: Cowley, Douglas, Gove, Greenwood, Gray, Kingman; June, July. NEBRASKA: Lancaster, Saline; June, July. OKLAHOMA: Cleveland; April, May. SOUTH DAKOTA: Haakon; June.

In superficial appearance, *cribulosus* looks like a member of the *communis* complex; however, the mandibular pit removes it from that group. The shallow parantennal fovea and dense pronotal punctures distinguish it from other members of the *americanus* group.

19. *Melanotus corticinus* (Say)

FIGURES 5*n*, 10*i*

Elater corticinus Say, 1823, p. 174; 1839, p. 183.
Cratonychus corticinus.—LeConte, 1853, p. 473.
Cratonychus vetulus Erichson, 1842, p. 105. [New synonymy.]
Melanotus vetulus.—Leng, 1920, p. 175.
Melanotus glandicolor Melsheimer, 1846, p. 152.—Emmons, 1854, p. 88.—Candèze, 1860, p. 371.—Blatchley, 1910, p. 745.—Thomas, 1941, p. 259.
Cratonychus glandicolor.—LeConte, 1853, p. 477.

MALE.—Body color reddish brown, covered with whitish vestiture, evenly distributed over body.

Head: Front with shallow depressions, margin thick, dark reddish brown, not strongly protuberant above clypeus, angulate and blunt when viewed from above; parantennal fovea large, deep and rounded, foveal tragus weakly developed; nasale usually as wide as or a little less than height, well developed. Mandible with large slitlike pit; palpus reddish brown, antenna exceeds tip of hind angle by 2 or 3 segments, segments 2 and 3 subequal, flagellar segments elongate and slender, segment 4 about twice as long as maximum width, erect male hairs sparse, but long and easily seen.

Pronotum wider than long; punctures in center usually separated by distance equal to less than own diameter, equal to size of punctures on front; sides of pronotum straight and divergent posteriorly with slight anterior curvature, hind angles divergent with carina usually extending little cephalad of base. Genitalia as figured; paramere with apical blade.

Elytron: 10.6 mm (10.1–11.8). 11 spec.

FEMALE.—Similar to male; antenna 3 a little larger than 2, but still much smaller than 4, so not intermediate in size between 2 and 4; genitalia as figured, accessory gland slender, bursa with moderate number of tacklike spines.

Elytron: 11.8 mm (11.0–12.7). 7 spec.

TYPES.—Types of *corticinus:* "United States," specimens lost.

Lectotype of *glandicolor:* Female, no locality data, but stated to be Pa. (MCZ). First specimen of type series selected as lectotype by authors in 1962, but other 2 specimens probably not true types.

Holotype of *vetulus:* Female, "America Sept." (ZM). Only specimen in type series.

DISTRIBUTION.—Ontario, eastern U.S. west to Illinois and Missouri.

ILLINOIS: Kankakee, Vermilion; June, July. INDIANA: Clark; June. MARYLAND: Baltimore; June. MONTANA: Montgomery; May. NEW JERSEY: Warren; June. NORTH CAROLINA: Buncombe; June. PENNSYLVANIA: Adams; May. TENNESSEE: Sevier; June. VIRGINIA: Norfolk; May. ONTARIO: Pr. Edward.

Melanotus corticinus is one of the more easily identified species; the small third antennal segment, large parantennal fovea, and large size make its recognition relatively easy. Females with a larger third antennal segment may cause a little trouble in running through the key, but even though the third segment is larger than the second, it is not intermediate in size between the second and fourth and should not be taken out in the wrong part of the couplet.

20. *Melanotus sagittarius* (LeConte)

FIGURES 5*m*, 10*c*; PLATE 1*k*

Cratonychus sagittarius LeConte, 1853, p. 480.

Melanotus sagittarius.—Candèze, 1860, p. 547.—Blatchley, 1910, p. 751.—Thomas, 1941, p. 260.—Dietrich, 1945, p. 58.
Melanotus carinus Blatchley, 1910, p. 752; 1930, p. 35. [New synonymy.]

MALE.—Body color reddish brown, covered with yellowish vestiture, evenly distributed over body.

Head: Front with pair of shallow anterolateral or an anterior transverse depression, margin angulate with blunt apex when viewed from above, not strongly protuberant above clypeus; parantennal fovea large and deep, as long as antennal segment 2, opening rounded, foveal tragus weakly developed; nasale protuberant, width 1 to 1⅛ times height. Mandible with deep, teardrop-shaped pit. Antenna exceeds tip of hind angle by 2 to 2½ segments, reddish brown, ratio of segments 2:3:4=3:6:9, flagellar segments rather elongate, segment 4 about twice as long as maximum width; erect male hairs long, rather dense, and easily seen.

Pronotum wider than long, ratio of width/length=1.14(1.05–1.22); punctures at center usually separated by distance equal to about own diameter, subequal to size of those on front; sides of pronotum nearly straight beyond small anterior curvature, sometimes with slight concavity at base of hind angle. Genitalia as figured; paramere with apical blade.

Elytron: 9.90±0.54 mm (8.70–10.80). 50 spec.

FEMALE.—Antenna exceeds tip of pronotum by 1 to 1½ segments; genitalia as figured, bursa with moderate number of peglike spines; accessory gland little longer than bursa, arises well before sperm duct; sperm duct branches near base.

Elytron: 10.2±0.9 mm (8.5–12.0). 31 spec.

TYPES.—Lectotype of *sagittarius:* Male, labelled with white circle "Eastern States & Canada" (MCZ). First specimen in type series selected as lectotype by authors in 1962. Second specimen labelled with pink circle "Middle States" is probably the type mentioned in the description but is damaged and cannot be identified definitely, so has not been selected. There appears no question that LeConte studied the first specimen and that it agrees with current interpretation of *sagittarius*, and its selection as the lectotype will fix the name of the species without disturbing the present nomenclature.

Holotype of *carinus:* Male, Lake Co., Ind., June 4, 1905 (PU).

DISTRIBUTION.—New York to Florida and west to Illinois.

FLORIDA: Pinellas; February, April. ILLINOIS: Putnam; July. INDIANA: Marion; May. MARYLAND: Baltimore; July. MASSACHUSETTS: Hampshire, Middlesex; June, July. MISSISSIPPI: George; April. NEW JERSEY: Middlesex; July. NEW YORK: Dutchess, Rockland, Tompkins, Westchester; June, July. OHIO: Athens; June. PENNSYLVANIA: Allegheny, Bradford, Monroe; May, July. VIRGINIA: Page; July. WEST VIRGINIA: Hardy; July.

21. *Melanotus hyslopi* Van Zwaluwenburg

FIGURES 5*l*, 10*f*

Melanotus hyslopi Van Zwaluwenburg, 1921, p. 210.—Thomas, 1941, p. 261.—Dietrich, 1945, p. 59.—Fattig, 1951, p. 22.

MALE.—Body color reddish brown, covered with white or yellowish vestiture, evenly distributed over body.

Head: Front with pair of shallow anterolateral depressions, not strongly protuberant above clypeus, angularly produced into truncated projection when viewed from above; parantennal fovea large and deep, excavated as deep as length of antennal segment 2, crescent shaped, foveal tragus weakly developed; nasale strongly protuberant, as wide as high. Mandible with deep, rounded, or ovate pit. Antenna exceeds tip of hind angle by 2–3 segments, segment 3 intermediate to 2 and 4, reddish brown, flagellar segments rather elongate, segment 4 about twice as long as maximum width; erect male hairs long, but sparse.

Pronotum wider than long, ratio of width/length=1.05–1.18; punctures at center usually separated by distance equal to more than twice own diameter, smaller than those on front; sides of pronotum straight behind anterior curvature and divergent posteriorly; hind angles divergent, with carina usually extending well cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 8.5±0.3 (7.6–9.1). 60 spec.

FEMALE.—Antenna exceeds tip of hind angle by 1½–2 segments; internal genitalia as figured, bursa with large swelling at base of accessory gland, gland clavate, elongate apex of bursa looped, spermathecal duct branches near base, diverticulum very short and curled.

Elytron: 8.7±0.4 mm (7.6–9.4). 55 spec.

TYPE.—Holotype: Male, South Mountain, Md. (USNM 24561). Not studied by authors.

DISTRIBUTION.—New Hampshire south to North Carolina and west to Wisconsin and Illinois.

CONNECTICUT: Litchfield; June. ILLINOIS: Champaign, McHenry; July, September. MARYLAND: Anne Arundel, Baltimore, Frederick; June, July. MASSACHUSETTS: Barnstable, Bristol, Essex, Hampshire, Middlesex; June, August. MICHIGAN: Oceana; August. MISSISSIPPI: Forrest; April. NEW HAMPSHIRE: Carroll; August. NEW JERSEY: Atlantic, Bergen, Camden, Ocean; May, July. NEW YORK: Erie, Essex, Niagara, Rockland, Suffolk, Sullivan, Tompkins; May, September. NORTH CAROLINA: Buncombe, Macon; July. OHIO: Delaware, Fairfield, Hocking, Summit; May, July. PENNSYLVANIA: Dauphin, Monroe, Northampton, Philadelphia; May, July. TENNESSEE: Sevier; June, July. VIRGINIA: Giles, Rockbridge; July, August. WISCONSIN: No other data. ONTARIO: Pr. Edward Co.; June.

M. hyslopi and *sagittarius* have larger parantennal fovea than any other North American *Melanotus* and can be distinguished by that character in addition to more usual features of ordinary size, mandibular pit, and intermediate sized third antennal segment. They may be separated from each other by *hyslopi* generally being smaller, having sparser pronotal punctures, longer antennae, larger parantennal fovea, and a more angulate frontal margin.

22. *Melanotus prasinus* Blatchley

FIGURES 6*a*, 10*g,h*

Melanotus prasinus Blatchley, 1910, p. 752; 1930, p. 35.—Thomas, 1941, p. 258.

MALE.—Body color reddish brown, covered with white vestiture evenly distributed over body.

Head: Front with pair of shallow anterolateral transverse depressions, margin dark reddish brown, sometimes strongly protuberant above clypeus and turned up in front, fairly thin, parantennal fovea moderately small, but well defined, arc shaped, with small foveal tragus; nasale poorly developed 1½–2 times as wide as high. Mandible with deep slit or teardrop-shaped pit. Antenna exceeds tip of hind angle by 1–2 segments, reddish brown, ratio of segments 2:3:4= 3:4:5, segment 4 about twice as long as maximum width; erect male hairs short and rather sparse but easily seen.

Pronotum usually wider than long, ratio of width/length=1.0–1.07; punctures at center usually separated by distance equal to about twice own diameter, slightly denser on margins, smaller than punctures on front; sides of pronotum gently rounded and divergent posteriorly on anterior half, with concavity at base of hind angles; hind angles divergent, carina weak, extending little cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 6.8 mm (6.2–7.3). 14 spec.

FEMALE.—Similar to male; bursa with moderate number of pointed, plaquelike spines; accessory gland originates near apex of bursa.

Elytron: 7.5 mm. 1 spec.

TYPE.—Holotype of *parasinus:* Male, Vermilion Co., Ind., June 15, 1904, W. S. B. (PU).

DISTRIBUTION.—Connecticut to North Carolina, west to Illinois and Missouri.

CONNECTICUT: Windham; August. ILLINOIS: Champaign; July. MARYLAND: Plummers Isl.; April, June. MASSACHUSETTS: Barnstable, Middlesex; July. MONTANA: Carter; June. NEW HAMPSHIRE: Hillsboro; no date. NEW JERSEY: Bergen, Cape May; June, July. NEW YORK: Kings; July. NORTH CAROLINA: Buncombe; July. OHIO: Hocking, Lucas; June. PENNSYLVANIA: "Estes"; July. TENNESSEE: Smith; no date.

The few specimens of *prasinus* available to us do not give a satisfactory picture of this species, and we know little of its variation or geographical distribution. We have three more males and two females that might belong to *prasinus*, but they differ in outline and shorter, less jutting frontal margin and are questionably identified as *prasinus* and are not included in the description.

Probably *M. prasinus* will most likely be confused with small specimens of *depressus* from which *prasinus* differs in having smaller and sparser pronotal punctures, a better developed nasale, and a more strongly jutting frontal margin.

23. *Melanotus piceatus* Blatchley

FIGURES 5*k*, 10*j*

Melanotus piceatus Blatchley, 1927, p. 141; 1930, p. 48.—Fattig, 1951, p. 22.

MALE.—Body color dark reddish brown to black, covered with sparse yellowish vestiture, evenly distributed over body.

Head: Front with pair of shallow to marked depressions, margin variable from thick and barely protruding beyond clypeus to thin and extending beyond clypeus by little more than own width, rounded or angulate and flattened anteriorly when viewed from above; parantennal fovea small, shallow, arc shaped; nasale flat, width about 1½ times height. Mandible pit slit to teardrop shaped; palpus light reddish brown. Antenna short of tip of hind angle by about 1 segment, reddish brown, segment 3 nearly as long as 4, 4 about 1½ times maximum width, erect male hairs very short and evident only at base of segments.

Pronotum wider than long; punctures at center usually separated by distance equal to 1–2 times own diameter, subequal to those on front; sides gently curved over anterior one-third or one-half, subparallel or convergent posteriorly with small concavity; hind angles slightly divergent with carina usually extending cephalad of base of hind angles. Genitalia as figured; paramere without apical blade.

Elytron: 8.4 mm (7.5–10.2). 10 spec.

FEMALE.—Antenna short of tip of hind angle by 1–3 segments; internal genitalia as figured, bursa large, with 50–100 scattered, peglike spines.

Elytron: 8.6 mm (7.7–9.2). 7 spec.

TYPE.—Holotype of *piceatus:* Male, Dunedin, Fla., March 17, 1922, W.S.B. (PU).

DISTRIBUTION.—Southeastern U.S.

ALABAMA: Colbert, Mobile; May, June. FLORIDA: Brevard, Charlotte, Highlands, Hillsborough, Pinellas, Volusia; February, May. GEORGIA: Chatham; March. SOUTH CAROLINA: Charleston, Georgetown, Pickens; May. TENNESSEE: Great Smoky Mts. Nat. Pk.; June.

The male genitalia of *piceatus* are somewhat similar to *cribulosus*. However, it is readily distinguished from that and other species by the short antennae and other characters. It apparently has no close relatives in North America and may be of Neotropical origin as suggested by its distribution.

24. *Melanotus difficilis* Blatchley

FIGURE 6*g*

Melanotus difficilis Blatchley, 1910, p. 751; 1930, p. 35.—McClure, 1933, p. 145.—Dietrich, 1945, p. 59.

MALE.—Body color reddish brown, covered with whitish vestiture, evenly distributed over body and longer than usual.

Head: Front without marked, transverse depressions but sometimes with pair of shallow anterolateral ones, margin extending as thick shelf in front of clypeus usually twice width of rim, anteriorly rounded when viewed from above; parantennal fovea lacking or obsolescent; nasale not developed. Mandible with small teardrop-shaped pit. Antenna reddish brown, exceeds tip of hind angle by 3 to 3½ segments, segment 3 intermediate to 2 and 4, flagellar segments long and slender, segment 4 twice as long as maximum width, following more slender; erect male hairs very short but dense.

Pronotum flattened dorsally, wider than long; punctures at center usually separated by distance equal to about own diameter, subequal to those on front; sides of pronotum divergent posteriorly on anterior half and parallel or a little convergent over remainder, hind angles divergent, with carina usually extending about to base of hind angle.

Abdomen with last visible sternite usually inflated to give tip enlarged appearance. Genitalia as figured; paramere with apical blade.

Elytron: 7.5–9.7 mm.

FEMALE.—Unknown to us.

TYPE.—Holotype of *difficilis:* Male, Posey Co., Ind., July 8, 1903, W.S.B. (PU).

DISTRIBUTION.—Central U.S.

KANSAS: Douglas; June. ILLINOIS: Alexander; June. MISSISSIPPI: George; May. OKLAHOMA: Delaware; June. TEXAS: Austin, Dallas, Navarro; May.

25. *Melanotus macer* (LeConte)

FIGURES 6*e,f*, 10*l*

Cratonychus macer LeConte, 1853, p. 473.

Melanotus macer.—Candèze, 1860, p. 339.—Blatchley, 1910, p. 752.—Dietrich, 1945, p. 54.—Fattig, 1951, p. 20.

MALE.—Body color reddish brown, covered with whitish hairs, evenly distributed over body and longer than usual.

Head: Front with conspicuous anterior, transverse depression, margin extends as a thin shelve in front of clypeus by distance equal to 2–3 times width of rim, angulate and flattened in front when viewed from above and often with small, median notch; parantennal fovea small but well defined, crescent shaped, opening much longer than wide; nasale not developed. Mandible with small, slit-shaped pit. Antenna long, exceeds tip of hind angle by 3–4 segments, reddish brown, segment 3 intermediate to 2 and 4, flagellar segments slender, nearly parallel sided, not serrate, segment 4 twice as long as maximum width, following more slender; erect male hairs short, sparse, and inconspicuous.

Pronotum wider than long; punctures at center usually separated by distance equal to little less than own diameter, subequal to those on front; sides of pronotum straight with little or almost no anterior curvature and slightly divergent posteriorly; hind angles almost parallel with carina, usually extending cephalad of base of hind angles. Genitalia as figured; paramere with apical blade.

Elytron: 7.2–7.6 mm.

FEMALE.—Unknown to us.

TYPES.—Lectotype of *macer:* Male, labelled with pink circle "Middle States, incl. N.Y." (MCZ 2507). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—North Carolina west to Kansas.

IOWA: Story; June. KANSAS: Cherokee, Riley; June, July. MISSISSIPPI: George; May. NEW YORK: Nassau; July. NORTH CAROLINA: Moore, Wake; May.

The two species *difficilis* and *macer* can be separated from other North American *Melanotus* by the long, slender, nonserrate antennae greatly extending beyond the pronotum, the obsolescent nasale, and poorly developed or vestigial parantennal fovea. The two can be distinguished without difficulty by characters cited in the key.

26. *Melanotus testaceus* (Melsheimer)

FIGURES 6*b*, 11*c*,*d*

Ctenonychus testaceus Melsheimer, 1846, p. 151.
Melanotus testaceus.—Thomas, 1941, p. 258.
Cratonychus dubius LeConte, 1853, p. 479. [New synonymy.]
Melanotus dubius.—Candèze, 1860, p. 372.—Thomas, 1941, p. 260.—Fattig, 1951, p. 21.
Melanotus angustatus of authors, not Erichson, 1842.

MALE.—Body color reddish brown, covered with white vestiture, evenly distributed over body.

Head: Front with pair of shallow anterolateral transverse depressions, margin not strongly protuberant above clypeus, evenly rounded or angulate and flattened across center; parantennal fovea small, deep

and well defined, semicircular; nasale protuberant, width 1 to 1¼ times height. Mandible with deep, oval pit. Antenna exceeds tip of hind angle by 1 to 1½ segments along sides, reddish brown, ratio of segments 2:3:4=3:4.5:5, segment 4 about 1¾ times as long as maximum width, erect male hairs short but easily seen.

Pronotum usually as wide as long, ratio of width/length=1.0–1.07; punctures at center usually separated by distance equal to about twice own diameter, smaller than punctures on front; sides of pronotum behind small anterior curvature nearly straight except slight concavity near center and markedly divergent posteriorly; hind angles divergent, carina usually extending cephalad of base of hind angle. Genitalia as figured; paramere slender, tapering, without apical blade.

Elytron: 7.0±0.5 mm (5.2–7.8). 29 spec.

FEMALE.—Similar to male; bursa with moderate number of scattered, plaquelike spines, accessory gland originates near center of bursa, spermathecal duct diverticulum originates not far from base of duct, short and capitate.

Elytron: 6.9±0.3 mm (6.3–7.5). 23 spec.

TYPES.—Type of *testaceus:* No specimen found at MCZ definitely labelled and unquestionably the type. In LeConte Collection a teneral (and hence testaceous) male labelled (by LeConte?) "*angustatus.*" We suspect this specimen is the type of *testaceus* and think LeConte placed it with *angustatus* after he decided the two species were synonymous (1853, p. 475).

Type of *dubius:* Male, labelled with orange circle "Southern States" (MCZ 2520). Only specimen in type series; the orange label indicating locality in South does not correspond with LeConte's (1853, p. 479) listing of N.Y., but nonetheless is regarded as the type.

DISTRIBUTION.—New York to Florida, west to Missouri and Texas.

ARKANSAS: Hempstead, Washington; April, August. FLORIDA: Pinellas; April. GEORGIA: Fulton; June. ILLINOIS: Alexander, Lawrence; April, July. MONTANA: Callaway; May. NEW JERSEY: Ocean; June. NEW YORK: Suffolk, Tompkins; June, August. NORTH CAROLINA: Wayne; April. OHIO: Delaware, Greene, Hocking, Scioto; May, June. TEXAS: no data. VIRGINIA: Nottoway; May.

This species has been identified as *angustatus*, and nearly all of our identifications will bear a label with that name. However, the type of *angustatus* is a specimen of *americanus*, and for a long time the species has been misidentified in North America.

The name *testaceus* is used for this species, although it is based on tenuous grounds, as there appears to be no unequivocal type specimen; however, this seems to be the name most aptly applied to the species.

Undissected specimens will often be confused with *trapezoideus*, although the characters in the key will be useful in separating the two

most of the time. It is advisable to dissect the genitalia from at least a part of the collection being identified.

27. *Melanotus trapezoideus* (LeConte)

FIGURES 6c, 11b

Cratonychus trapezoideus LeConte, 1853, p. 475.
Melanotus trapezoideus.—Candéze, 1860, p. 348.—Blatchley, 1910, p. 752.—Thomas, 1941, p. 259.—Dietrich, 1945, p. 55.—Jewett, 1946, p. 9.—Fattig, 1951, p. 20.

MALE.—Body color reddish to dark reddish brown, covered with white or yellowish vestiture, evenly distributed over body.

Head: Front usually with pair of shallow anterolateral depressions; margin dark reddish brown, thinner in center, angulate and flattened when viewed from above, weakly protuberant in front; parantennal fovea semicircular or circular, well defined; nasale raised, as wide as high. Mandible with small teardrop-shaped or oval pit. Antennae exceeds tip of hind angle by 1 to 1½ segments, reddish brown, ratio of segments 2:3:4=5:8:10, segment 4 about 1⅔ times maximum width, erect male hairs of moderate length and dense.

Pronotum wider than long, ratio of width/length=1.07–1.16; punctures at center usually separated by distance equal to little more than own diameter, equal or subequal to those on front; sides of pronotum straight behind small anterior curvature, diverging posteriorly; hind angles divergent, with carina usually extending cephalad of base of hind angles. Genitalia as figured; paramere without apical blade.

Elytron: 6.1±0.5 mm (5.2–7.3). 35 spec.

FEMALE.—Antenna exceeds tip of hind angle by about one-half segment; internal genitalia as figured, bursa not elongate or enlarged at base of accessory gland and with more than 50 peglike spines.

Elytron: 5.1–6.9 mm. 6 spec.

TYPES.—Lectotype of *trapezoideus:* Male, labelled with pink circle "Middle States, incl. N.Y." (MCZ 2511). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—Ontario to North Carolina, west to Minnesota, Illinois, and Arkansas.

ARKANSAS: Garland, Washington; June. CONNECTICUT: Litchfield, New Haven; June, July. ILLINOIS: Champaign, Knox, McHenry, Putnam, Rock Island; May, July. MASSACHUSETTS: Berkshire, Hampshire, Middlesex, Norfolk; June, July. MINNESOTA: Hennepin; July. MISSISSIPPI: George; June. NEW HAMPSHIRE: Carroll; August. NEW JERSEY: Bergen, Gloucester; June. NEW YORK: Erie, Essex, Oswego, Rockland, Suffolk, Tompkins, Westchester; April, September. NORTH CAROLINA: Macon; June. PENNSYLVANIA: Adams, Dauphin, Indiana, Philadelphia; May, July (November). WEST VIRGINIA: Marion, Pendleton; August. ONTARIO: Ridgeway; August.

28. *Melanotus tenax* (Say)

FIGURES 6*d*, 11*a*; PLATE 1*m*

Elater tenax Say, 1839, p. 185.
Cratonychus tenax.—LeConte, 1853, p. 479.
Melanotus tenax.—Candèze, 1860, p. 360.—Blatchley, 1910, p. 755.—Thomas, 1941, p. 260.—Dietrich, 1945, p. 58.—Fattig, 1951, p. 21.

MALE.—Body color reddish to dark reddish brown, covered with white or yellow vestiture, evenly distributed over body.

Head: Front with pair of shallow anterolateral transverse depressions, margin dark reddish brown, not strongly protuberant above clypeus, thinner in center, evenly rounded or a little flattened anteriorly when viewed from above; parantennal fovea smaller than *trapezoideus*, well defined, circular; nasale slightly raised, width equal to 1½ times height. Mandible with deep, teardrop-shaped pit. Antenna exceeds tip of hind angle by one-half segment, reddish brown, ratio of segments 2:3:4=4:6:9, segment 4 about twice as long as maximum width; erect male hairs short and dense.

Pronotum as wide as or little wider than long; punctures at center usually separated by distance equal to own diameter, subequal to those on front; sides of pronotum straight, subparallel; hind angles slightly divergent, carina usually extending well cephalad of base of hind angle. Genitalia as figured; paramere without apical blade.

Elytron: 5.5±0.3 mm (5.2–6.3). 15 spec.

FEMALE.—Antenna not extending to tip of hind angle; internal genitalia as figured, bursa with about 50 peglike spines, elongate and enlarged at base of accessory gland, gland short and clavate.

Elytron: 5.0–6.2 mm. 4 spec.

TYPES.—Types of *tenax:* "Mass." Specimens lost.

DISTRIBUTION.—New York south to Georgia and west to Illinois.

GEORGIA: Houston; June. ILLINOIS: Greene; June. MARYLAND: Prince Georges; June. MASSACHUSETTS: Middlesex, Nantucket; June. NEW YORK: Albany; June. NORTH CAROLINA: Craven; May. SOUTH CAROLINA: Berkeley; April.

M. trapezoideus and the *tenax* can be distinguished from other species of the *americanus* group by their small size, large pronotal punctures, and large parantennal fovea. The two are separable by characters in the key. Also, the pronotum of *trapezoideus* is usually flatter and the sides more markedly divergent than in *tenax*. The female internal genitalia are dissimilar; the chief differences are the unusual swelling of the bursa at the base of the accessory gland and the midlateral origin of the spermathecal duct of *tenax*, but not in *trapezoideus*. Unlike most species of *Melanotus*, the male genitalia of these species appear indistinguishable and are not of value in separating the two.

29. *Melanotus pertinax* (Say)

FIGURES 6*l*, 10*k*

Elater pertinax Say, 1839, p. 185.
Cratonychus pertinax.—LeConte, 1853, p. 479.
Melanotus pertinax.—Candèze, 1860, p. 359.—Blatchley, 1910, p. 755.—Thomas, 1941, p. 260.—Dietrich, 1945, p. 58.—Severin, 1949, p. 17.—Fattig, 1951, p. 21.

MALE.—Body color black or dark reddish brown and appendages lighter reddish brown (light colored teneral specimens also have appendages paler than body), covered with white vestiture evenly distributed over body.

Head: Front with pair of shallow anterolateral or transverse depressions, margin narrow and evenly rounded when viewed from above, thick and not strongly protuberant above clypeus; parantennal fovea small but moderately deep circular or semicircular, foveal tragus seldom developed; nasale flat, width about 2 times height. Mandible with deep, teardrop-shaped pit. Antenna exceeds tip of hind angle by about 1 segment, reddish brown, ratio of segments 2:3:4=3:4:5, segment 4 about 1⅙ times as long as maximum width; erect male hairs short and dense.

Pronotum wider than long, ratio of width/length=1.06–1.20; punctures at center usually separated by distance equal to more than twice own diameter, smaller than those on front, sides of pronotum rounded and concave at base of hind angles; hind angles divergent, carina weak, usually not extending cephalad of base of hind angle. Genitalia as figured; paramere without blade.

Elytron: 6.4±0.4 mm (6.0–7.3). 50 spec.

FEMALE.—Antennal tip short of pronotum base by 1 segment; internal genitalia as figured, bursa with sparse, scattered peglike spines, accessory gland very short and clavate.

Elytron: 7.2±0.4 mm (6.6–8.1). 27 spec.

TYPES.—Types of *pertinax:* "Mass." Specimens lost.

DISTRIBUTION.—Maine to North Carolina, west to Wisconsin and Illinois.

CONNECTICUT: Litchfield, New Haven; May, July. GEORGIA: Clarke; May. ILLINOIS: Champaign, Knox, McHenry, McLean; May, July. MAINE: York; July. MASSACHUSETTS: Berkshire, Bristol, Hampshire, Middlesex, Suffolk, Worcester; April, August. MINNESOTA: Hennepin, St. Louis; May, June. NEW HAMPSHIRE: Hillsboro, Strafford; May, July. NEW YORK: Columbia, Erie, Putnam, Tompkins, Washington, Wyoming; May, August. NORTH CAROLINA: Buncombe; June. PENNSYLVANIA: Lycoming; July. SOUTH CAROLINA: Aiken; June. VERMONT: No data. WISCONSIN: Milwaukee; June.

That the appendages are of a different color than the body sets *pertinax* apart from other American *Melanotus*, since no other species has this coloration.

30. *Melanotus infaustus* (LeConte)

FIGURES 6*i*, 11*i*,*j*; PLATE 1*o*

Cratonychus infaustus LeConte, 1853, p. 478.
Melanotus infaustus.—Candèze, 1860, p. 357.—Thomas, 1941, p. 260.—Severin, 1949, p. 17.—Fattig, 1951, p. 21.

MALE.—Body color reddish brown, covered with whitish vestiture evenly distributed over body.

Head: Front with pair of shallow, anterolateral, transverse depressions, margin dark reddish brown, thin and strongly protuberant above clypeus, flattened anteriorly and straight when viewed from above; parantennal fovea small, but well defined, arc shaped, and depth about equal to width of opening; nasale as wide as high, slightly protuberant. Mandible with deep slitlike pit. Antenna exceeds tip of hind angle by about 1½ segments, reddish brown, ratio of segments 2:3:4=3:6:9, segment 4 about 1½ times as long as maximum width; erect male hairs short and only moderately dense.

Pronotum about as long as wide, punctures at center usually separated by distance equal to or less than own diameter, subequal to those on front, sides of pronotum straight behind anterior curvature, nearly parallel; hind angles divergent, carina usually extending slightly cephalad of base of hind angle. Genitalia as figured; paramere with apical blade.

Elytron: 5.5–7.6 mm. 10 spec.

FEMALE.—Antenna exceeds tip of hind angle by 1 or less segment; internal genitalia as figured, bursa with large patch of spines anteriorly and few, scattered ones posteriorly, spines teardrop shaped, spermathecal duct and accessory gland originate close together on bursa.

Elytron: 6.5–7.5 mm. 3 spec.

TYPES.—Lectotype of *infaustus:* Male, labelled with orange circle "Ga." (MCZ 2518). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—Florida, Georgia, Indiana, Illinois, Kansas, South Dakota, and Texas.

INDIANA: Tippecanoe; June. ILLINOIS: Whiteside; May. KANSAS: Douglas, Reno; June. SOUTH DAKOTA: Brookings, Lake; June, July. TEXAS: Big Bend Nat. Pk., Bexar, Kerr; March, June.

M. infaustus appears to be a rare species seldom seen in collections. It is difficult to identify positively unless the genitalia are dissected. Undissected specimens may be confused with the more common *tenax*, *trapezoideus*, and *prasinus* in the Midwest and South or with *lanceatus* in Texas. The slender thorax is helpful in separating it from other species, except *lanceatus*, but positive identification requires a study of the distinctive genitalia.

31. *Melanotus parallelus* Blatchley

FIGURES 6*h*, 11*g*; PLATE 1*n*

Melanotus parallelus Blatchley, 1920, p. 45; 1930, p. 44.—Deen and Cuthbert, 1945, p. 193.—Fattig, 1951, p. 22.

MALE.—Body color reddish brown, covered with white or yellowish vestiture, evenly distributed over body.

Head: Front with marked anterior depression, margin dark reddish brown, strongly protruding in front of nasale by several times own width, evenly rounded or angulate and flattened in center when viewed from above; parantennal fovea small, shallow, arc shaped or sometimes obsolescent; nasale flat, width equal to slightly more than height. Mandible with shallow, slit-shaped pit (easily obscured if specimen is dirty; thus, also keyed out in *fissilis* group). Antenna exceeds tip of hind angle by 1 to 1½ segments; reddish brown, segment 3 intermediate in size between 2 and 4, 4 about 1⅔ times as long as maximum width; erect male hairs short and moderately thick.

Pronotum slender, longer than wide; punctures at center usually separated by distance equal to own diameter or more, equal or subequal to those on front, sides of pronotum nearly straight behind anterior curvature and parallel or slightly convergent posteriorly, hind angles divergent, carina usually extending just to base of hind angle, close to and paralleling sides. Genitalia as figured; paramere with apical blade.

Elytron: 5.9 mm (5.7–6.3). 4 spec.

FEMALE.—Antenna ends short of tip of hind angle by about 1 segment; internal genitalia as figured.

Elytron: 5.9 mm.

TYPE.—Holotype of *parallelus:* Male, Dunedin, Fla., April 5, 1915, W.S.B. (PU).

DISTRIBUTION.—Southern U.S.

ARKANSAS: No data. FLORIDA: Highlands, Marion, Pinellas; February, April. NORTH CAROLINA: Montgomery, Moore; April, May.

The relatively slender pronotum which is as long as or longer than wide, and the thin, jutting frontal margin are the main features separating *parallelus* from other species of the *americanus* group. The outline of *parallelus* pronotum accentuates its narrowness and makes it appear longer in relation to the width than it really is. This is another species rarely seen in collections.

32. *Melanotus americanus* (Herbst)

FIGURES 6*j*, 11*e*,*f*

Elater americanus Herbst, 1806, p. 74.
Cratonychus americanus.—Erichson, 1842, p. 114.—LeConte, 1853, p. 479.

Melanotus americanus.—Candèze, 1860, p. 361.—Blatchley, 1910, p. 747.—Fattig, 1951, p. 21.

Cratonychus angustatus Erichson, 1842, p. 113.—LeConte, 1853, p. 475. [New synonymy.]

Melanotus angustatus.—Candèze, 1860, p. 345.—Blatchley, 1910, p. 753.—Thomas, 1941, p. 258.

MALE.—Body color reddish brown, covered with white vestiture evenly distributed over body. Small species.

Head: Front with pair of shallow, anterolateral, or single, curved anterior depressions, margin dark reddish brown, protuberant above clypeus, a little angulate or flat across center when viewed from above; parantennal fovea large, semicircular, moderately deep, with weak foveal tragus; nasale usually as wide as high, well developed. Mandible with deep, teardrop-shaped pit. Antenna exceeds tip of hind angle by 1½–2 segments; segment 3 short but intermediate between 2 and 4, ratio of segments 2:3:4=2:3:5, segment 4 about 1⅝ times as long as maximum width; erect male hairs long and conspicuous.

Pronotum usually wider than long, ratio of width/length=1.00–1.17, rounded in appearance when viewed from side; punctures small at center and usually separated by distance equal to twice own diameter; sides of pronotum rounded anteriorly and almost parallel behind. Genitalia as figured; paramere enlarged apically, but without apical blade.

Elytron: 5.4±0.4 mm (4.5–6.3). 50 spec.

FEMALE.—Antenna extends to tip of hind angle or exceeds it by about one-half segment; genitalia as figured, numerous spines in anterior half, spines long and without flat bases, pouchlike swelling at base of accessory gland, gland short and expanded beyond base, diverticulum branching from spermathecal duct near center of duct.

Elytron: 5.7±0.3 mm (4.8–6.7). 93 spec.

TYPES.—Lectotype of *americanus:* Male, "America Sept." (ZM). Selected by Quate, 1960. Seven other males in type series.

Lectotype of *angustatus:* Female, "Pennsylvania" (ZM 17057). Selected by Quate, 1960; 4 other females in type series.

DISTRIBUTION.—Eastern U.S. west to Indiana and Illinois.

CONNECTICUT: Hartford, Litchfield; June. DELAWARE: Sussex; May. GEORGIA: DeKalb, Fulton, Rabun; May, June. ILLINOIS: McHenry, Putnam, Rock Is.; June, July. INDIANA: Marion; July. MARYLAND: Anne Arundel, Baltimore, Frederick, Plummers Is.; June, July. MASSACHUSETTS: Barnstable, Hampshire, Middlesex; June, September. NEBRASKA: Cass; May, July. NEW JERSEY: Bergen, Middlesex, Morris, Union; June, July. NEW YORK: Putnam, Suffolk, Westchester; April, August. NORTH CAROLINA: Buncombe, Cherokee, Cumberland, Moore, Montgomery, Pender, Pickens, Swain, Wake; April, July. OHIO: Delaware, Fairfield, Franklin, Greene, Hocking; May, June. PENNSYLVANIA: Allegheny, Dauphin, Northampton, Perry; June,

July. RHODE ISLAND: Washington; July. SOUTH CAROLINA: Oconee; March. WEST VIRGINIA: Greenbrier; July.

Melanotus americanus is one of the smaller species of North American *Melanotus*. This feature, with the small third antennal segment and high rounded pronotum bearing small, scattered punctures, makes the species more readily recognized than many others.

Examination of the types of *angustatus* indicates that this species has been misidentified for many years. The type series is mixed, but the first is definitely *americanus* and has been selected as the lectotype. This specimen has been dissected and the identification has been confirmed by M. C. Lane.

33. *Melanotus cribriventris* Blatchley

FIGURES 6*k*, 11*h*

Melanotus cribriventris Blatchley, 1910, p. 747; 1930, p. 33.

Melanotus longicornis Blatchley, 1910, p. 746; 1930, p. 35.—Thomas, 1941, p. 258. [New synonymy.]

Melanotus blatchleyi Leng, 1918, p. 205. [New name for *longicornis* Blatchley, not Candèze, 1860. New synonymy.]

MALE.—Body color reddish brown, covered with white or yellowish vestiture, evenly distributed over body.

Head: Front with shallow to marked anterior depression, margin dark reddish brown, not strongly protuberant above clypeus, angulate and blunt when viewed from above; parantennal fovea large, deep and well defined, nasale higher than wide, prominently raised. Mandible with deep, rounded pit. Antenna exceeds tip of hind angle by 3 to 3½ segments, segments 2 and 3 subequal, flagellar segments elongate and slender, segment 4 about twice as long as maximum width; erect male hairs long and shaggy.

Pronotum wider than long; punctures at center separated by distance equal to less than own diameter, subequal to size of punctures on front; sides of pronotum straight, divergent posteriorly with slight anterior curvature; hind angles divergent, with strong carina, extending cephalad of base. Genitalia as figured; paramere without apical blade.

Elytron: 7.2–7.6 mm. 5 spec.

FEMALE.—Antenna exceeds tip of hind angle by 2 segments; internal genitalia as figured, bursa with about 20 sharp, thornlike spines, accessory gland long and very slender, spermathecal duct branched near base.

Elytron: 7.8 mm (7.7–8.1). 8 spec.

TYPES.—Type of *longicornis:* Male, Orange Co., Ind., May 31, 1904. Not seen by us, but studied by M. C. Lane and determined to be same as *cribriventris*.

Holotype of *cribriventris*: Female, Kosciusko Co., Ind., July 11, 1904, W. S. B. (PU).

DISTRIBUTION.—New Jersey west to Kansas.

ILLINOIS: Rock Is.; no date. INDIANA: Allen; June. KANSAS: Douglas; no date. MARYLAND: Baltimore, Plummers Is.; April. NEW JERSEY: Warren; June. OHIO: Hamilton, Hocking; June. PENNSYLVANIA: Northampton; June. TENNESSEE: Morgan; May.

The long antennae and short third antennal segment are distinctive characteristics of *cribriventris*, and specimens go through the key with little difficulty. The shaggy antennae are especially characteristic of the male and provide an obvious clue to its identification.

Blatchley apparently believed the male and female belonged to two different species. He first named the male *longicornis*, but this name is preoccupied by *longicornis* Candèze. Leng observed the homonymy and renamed Blatchley's species *blatchleyi*. However, *cribriventris* is merely the female of *longicornis* Blatchley and is therefore available as a replacement name and has precedence over *blatchleyi*. Some identifications will bear this latter name, but the correct one is *cribriventris*.

34. *Melanotus obscuratus* Blatchley

FIGURES 7*b*, 11*l*

Melanotus obscuratus Blatchley, 1927, p. 141; 1930, p. 45.

MALE.—Body color dark reddish brown, vestiture white.

Head: Front with shallow, anterior depression, margin rounded, not strongly protuberant; parantennal fovea small but distinct, nasale wider than high, not well developed. Mandible with slitlike pit. Antenna exceeds tip of hind angle no more than 1 segment; segments 2 and 3 subequal, ratio of segments 2:3:4=2:3:6, segment 4 about twice as long as maximum width; erect male hairs short and inconspicuous.

Pronotum little longer than wide, ratio of width/length=0.9; punctures at center separated by about own diameter, subequal to size of punctures on front; sides of pronotum nearly parallel, hind angles a little divergent.

Genitalia as figured; paramere with well-defined apical blade.

Elytron: 6.0–6.4 mm. 2 spec.

FEMALE.—Antenna extends just to tip of hind angle; genitalia as figured, bursa with few spines largely in distal half, accessory gland originates well before apex, which leads to spermathecal duct.

Elytron: 7.4 mm. 1 spec.

TYPE.—Holotype: Male, Ormond, Fla., April 13, 1913, W. S. B. (PU).

DISTRIBUTION.—Southeastern U.S.

NORTH CAROLINA: Brunswick; June. FLORIDA: Volusia; April.

Three females in the type series belong to *morosus* as shown by their long third antennal segment and the internal genitalia characteristic of that species. However, the holotype and paratype males are distinct from other North American *Melanotus*. The female description above is based on a specimen from North Carolina associated with a male *obscuratus* and agreeing with that specimen in external characters.

35. *Melanotus beameri* Quate, new species

FIGURE 6*m*

MALE.—Body color light reddish brown, covered with yellowish vestiture evenly distributed over body.

Head: Front with shallow transverse, anterior depression; margin protruding in front of nasale by about twice width of rim, angulate or sometimes rounded and flattened in center when viewed from above; parantennal fovea small but well defined, crescent shaped; nasale obsolescent. Mandible with shallow, small, slitlike pit. Antenna reddish brown, exceeds tip of hind angle by 1–2 segments; segment 3 intermediate in size between 2 and 4; erect male hairs dense and of moderate length.

Pronotum slender, about as wide as long; punctures large and dense, as large as, or larger than, those on front and separated by less than own diameter; sides of pronotum with little or no anterior curvature and nearly parallel but a little rounded; hind angles markedly divergent, carina extends to base of hind angle, close to and paralleling side. Genitalia as figured; paramere without apical blade.

Elytron: 5.3 ± 0.3 mm (4.6–6.0). 34 spec.

FEMALE.—Unknown.

DISTRIBUTION.—Texas.

Holotype, male (KU): 65 mi. south of Marathon, Brewster Co., Texas, July 10, 1938, R. H. Beamer.

Paratypes, 33 males (KU, USNM, CNC): same as holotype; near Dugout Well, Big Bend Nat. Pk., Texas, April 17, 1953, B. J. Adelson; Panther Jct. and Nine Pt. Draw, Big Bend Nat. Pk., Texas, May 20, 1959, 2,600–4,000 ft., Howden and Becker; Oak Spring, Big Bend Nat. Pk., May 22, 1959, 4,000 ft., Howden and Becker.

M. beameri is similar to the following species, but readily separated from them by the undeveloped nasale, large and coarse pronotal punctures, and male genitalia.

The species is named in honor of Dr. R. H. Beamer, the late Curator of the Snow Collection, University of Kansas, who did much work in the American Southwest and through his diligent efforts added significantly to our knowledge of insect fauna in that region.

36. *Melanotus concisus* Knull

FIGURES 7*a*, 12*a*

Melanotus concisus Knull, 1959, p. 281.

MALE (after Knull).—Body color dark brown, legs lighter, vestiture short.

Head: Frontal margin broadly rounded, projecting over nasale; parantennal fovea deep. Mandible with deep pit. Antenna exceeds tip of hind angle by part of 1 segment; segment 3 subequal to 2.

Pronotum little longer than wide; punctures dense, coarse, umbilicate on anterior two-thirds, fine and sparse on posterior one-third; sides of pronotum rounded. Genitalia as figured; paramere with apical blade.

FEMALE (?).—Frontal margin nearly straight across center, projects in front of nasale by width of rim; nasale poorly developed, parantennal fovea shallow but definite. Antenna fails to reach tip of hind angle by about 1 segment. Pronotum wider than long. Genitalia as figured; bursa with dense patch of pointed plaquelike spines, accessory gland originates near apex of bursa.

Elytron: 6.1 mm (5.8–6.3). 5 spec.

TYPE.—Holotype: Male, Artesia (Eddy Co.), N. Mex. (Knull Collection).

DISTRIBUTION.—Arizona and New Mexico.

ARIZONA: Cochise, Santa Cruz; August. NEW MEXICO: Sandoval; August.

The above females agree reasonably well with the male described by Knull and tentatively we are assigning them to *concisus*. The small third antennal segment, large pronotal punctures, small size, and distribution are the main recognition characters of the species, aside from the genitalia. Positive identification of the female cannot be made, however, until associated with male in the field.

37. *Melanotus lanceatus* Quate, new species

FIGURES 7*c*, 12*b*

MALE.—Body color reddish to dark reddish brown, covered with white vestiture evenly distributed over body.

Head: Front with pair of shallow anterolateral or no depressions, margin scarcely protruding in front of nasale, angulate and flattened in center when viewed from above; parantennal fovea moderately large, deep and circular, or semicircular; nasale protuberant, as wide as or wider than high. Mandible with slit-shaped or teardrop-shaped slit. Antenna reddish brown, exceeds tip of hind angle by 2–3 segments; segment 3 intermediate in size between 2 and 4; erect male hairs short but dense.

Pronotum as wide as or less wide than long; punctures at center separated by about own diameter, smaller than those on front; sides of pronotum straight behind small anterior curvature, parallel or divergent posteriorly; hind angles divergent, carina extending to base of hind angle, close to and paralleling side. Genitalia as figured, very slender; paramere with weakly developed apical blade.

Elytron: 6.5±0.4 mm (5.7–7.2). 64 spec.

FEMALE.—Antenna exceeds tip of hind angle by about one-half segment; pronotum with sides more rounded and not parallel; internal genitalia as figured, bursa with patch of close-set, plaquelike spines, bases of accessory gland and spermathecal duct at apex of bursa, gland not clavate.

Elytron: 6.5 mm (6.3–7.0). 12 spec.

DISTRIBUTION.—Arizona and Texas.

Holotype, male (USNM): Dimmit Co., Texas, May 21, 1934, light trap. Allotype, female (USNM): same, June 7, 1933, H. J. Reinhard.

Paratypes, 99 males, 12 females (USNM, CAS, CIS, CU, INHS, U. Ariz., Texas A and M, CNC): ARIZONA. Cochise Co.: Huachuca Mts., July 19, Knull; same, Aug. 8, 9, 1952, 5400 ft., Leech and Green. Santa Cruz Co.: Canelo, July 10, 1957, G. A. Butler; Nogales, Aug. 12, 1906; Santa Rita Mts., July 20, 25, 1959, J. G. Franclemont. TEXAS. Bell Co.: Salado, April 10. Bexar Co.: San Antonio, Mar. 17, 1953, B. J. Adelson. Brewster Co.: Alpine, July 1–15, 1926, O. C. Poling; same, July 11, 1962, L. W. Hepner; Chisos Mts., June 10–12, 1908, Mitchell and Eichmann; Santa Elena, Big Bend Nat. Pk., May 4, 1959, 2,200 ft., Howden and Becker. Blanco Co.: Cypress Mills, April 2. Burnet Co.: no locality, June. Cameron Co.: Brownsville, March 20, 1937, T. N. Freeman; same, May 17, 1904, H. S. Barber; same, May 20, 1937, May 30, 1932, June 3, 1932. Dimmit Co.: no locality, March 17, 1933, April 3, 30, 1933, June 7, 1933. Duval Co.: San Diego, April 27. Goliad Co.: Goliad, April 18, E. A. Schwarz. Gonzales Co.: Luling, April 11, 1953, at light, B. J. Adelson. Hidalgo Co.: Edinburg, no date. Jeff Davis Co.: Davis Mts., June 28, July 8, 1946. Jefferson Co.: Sabina, March, April 1910, F. C. Pratt. Kerr Co.: Kerrville, April 2–18, 1959, Becker and Howden; same, April 11, 1906, June 1906, F. C. Pratt. Kleberg Co.: Kingsville, no date. LaSalle Co.: Cotulla, April 17, 1906, May 12, 1906, March 27, 1908, F. C. Pratt. Robertson Co.: Hearne, June 7, 1936, K. L. Maehler. Randall Co.: 15 mi. east of Canyon, June 26, 1956, R. E. Selander. Sutton Co.: Sonora, April. Terrell Co.: Sanderson, April 27, 1959, Becker and Howden. Val Verde Co.: Del Rio, April 13, 1949, Michener and Beamer; 13 mi. south of Del Rio, April 10, 1950, Beamer et al.; Devil's River, May 5, 1907, E. A. Schwarz. Victoria Co.: Victoria, March 26, J. D. Mitchell.

M. lanceatus is closely related to *longulus*. The male genitalia of the two are similar, but in *lanceatus* are much more elongate and slender; the female internal genitalia have the same type of bursal spines, but the origin of the accessory gland is in a different position in each. Externally, the smaller pronotal punctures in *lanceatus* are the most noticeable difference.

In view of the closeness of the two and their allopatric distribution, it is debatable if *lanceatus* should be considered a subspecies of *longulus*. We decided against that ranking on the basis that the differences between *lanceatus* and *longulus* are greater than between the two subspecies of *longulus* and that the female internal genitalia indicate a greater divergence of the two than other characters. It seems to us highly improbable that the two are capable of interbreeding with female reproductive organs so dissimilar, and, therefore, they should not be considered as belonging to the same species.

38. *Melanotus hamatus* Knull

FIGURE 7*d*

Melanotus hamatus Knull, 1959, p. 280.

MALE.—Body color reddish brown, covered with whitish vestiture.

Head: Front with small, transverse depression behind margin, margin angulate, coming to obtuse but noticeable point at midline, protruding in front of nasale only by width of black rim; nasale not strongly elevated but defined, wider than long; parantennal fovea shallow, C-shaped, definite. Mandible with deep, elongate pit. Antenna exceeds tip of hind angle by about one-half segment; segment 3 small, much smaller than 4 but a little larger than 2.

Pronotum wider than long; punctures large as on front, compact, separated by less than own diameter; sides rounded with concavity in front of hind angles; hind angles small, divergent. Genitalia as figured; paramere with peculiar winglike flap on venter near center and without apical blade.

Elytron: 6.4 mm (5.8–6.9). 8 spec.

FEMALE.—Unknown to us.

TYPE.—Holotype: Male, Chisos Mtns., Texas (Knull Collection).

DISTRIBUTION.—Texas.

TEXAS: Big Bend Nat. Pk., Jeff Davis; July .

The small size, small third antennal segment, large and dense pronotal punctures, together with the limited distribution in the Southwest, will readily identify this species. Of course, dissected males show the unusual male paramere that is dissimilar to all other American *Melanotus*.

38a. *Melanotus longulus* (LeConte)

Cratonychus longulus LeConte, 1853, p. 473.
Melanotus longulus.—Candèze, 1860, p. 339.

MALE.—Body color reddish brown to black, covered with yellowish vestiture, evenly distributed over body.

Head: Front with shallow to marked anterior transverse depression, margin projects in front of nasale by width of rim or less, rounded or

angulate and flattened in front when viewed from above, sometimes depressed in center; parantennal fovea small, deep and crescent shaped, foveal tragus sometimes well developed; nasale usually developed but not strongly protuberant, wider than high. Mandible with small teardrop- or slit-shaped pit. Antenna light to dark reddish brown and lighter than body in dark specimens, exceeds tip of hind angle by 1 to 1½ segments, ratio of segments 2:3:4=3:4:7, flagellum usually strongly serrate, segment 4 about 1½ times as long as maximum width; erect male hairs short, variable from dense to sparse, but always evident.

Pronotum as long as or little wider than long; punctures subequal or clearly as large as those on front, separated by distance equal to less or more than own diameter.

FEMALE.—Antenna exceeds tip of hind angle by about one-half segment; sides of pronotum generally rounded; bursa with numerous, plaquelike spines, spermathecal duct branching at apex of bursa.

39. *Melanotus longulus longulus* (LeConte)

FIGURES 7*e*, 12*c*,*d*

Cratonychus longulus LeConte, 1853, p. 473.

Melanotus longulus.—Candèze, 1860, p. 339.—Horn, 1874, p. 23.—Van Dyke, 1932, p. 331.—Fall, 1934, p. 23.—Van Dyke, 1942, p. 51.—Stone and Howland, 1944, p. 1.

Reddish brown to black, lighter colored in Southwest. Antenna flagellum usually moderately serrate. Pronotal punctures subequal to those on front in Southwest and larger and denser in California, sides of pronotum nearly straight behind small anterior curvature, usually slightly convergent posteriorly.

Male genitalia as figured; apical blade sharply angulate with sharp outer, basal corner, concavity at base of blade well developed in Arizona and New Mexico and poorly developed in California.

Female internal genitalia as figured, accessory gland longer than bursa and very slender.

Male elytron: 7.2±0.6 mm (6.5–8.8). 50 spec.

Female elytron: 7.8±0.6 mm (6.3–9.0). 24 spec.

TYPES.—Lectotype of *longulus:* Male, labelled with gold circle "San Diego, Calif." (MCZ 2506). First specimen of type series selected as lectotype by authors in 1962.

DISTRIBUTION.—Southwestern U.S. south of Tehachapi Mtns., California, Great Basin, and Baja California.

ARIZONA. Cochise Co.: Chiricahua Mts., June 20, 1950; Douglas, Aug.: Huachuca Mts., 1960 m, Aug. 9, 1952; Portal, 2420 m, July 20, 1944; Whetstone Mts., SE, Aug. 10, 1952. Coconino Co.: Oak Creek Cyn., July 1941; Williams, July 2, 1953. Graham Co.: Graham Mts., Aug. 1, 1957. Maricopa Co.:

Aguila, Aug. 21, 1927. Mojave Co.: Valentine, Aug. 26, 1952. Pima Co.: Baboquivari Mts., west side, July 27, 1952; Santa Catalina Mts., July 2, 1954, July 3, 1955. Pinal Co.: Magna, Aug. 18, 1921; Oracle, July 7, 1950; Tucson, August 1935. Santa Cruz Co.: Mt. Washington, Nogales, 1829 m, July 13, 1919; Patagonia, July 1936. Yavapai Co.: Congress Jctn., July; Prescott, July 1, 1919. Yuma Co.: Yuma, March 7, 1879. CALIFORNIA. Imperial Co.: Salton Sea, Apr. 3, 1927. Inyo Co.: Lone Pine, May 12, 1937; Westgard Pass Plateau, Apr. 24, 1937; Whitney Portal, July 3, 1953. Kern Co.: Tejon Cnyn., May 12, 1927. Los Angeles Co.: Camp Baldy, June 26, 1958; Claremont, Apr. 19, 1926, May 13, 1927; Crystal Lake, June 29, 1950; La Canada, July 28, 1948; Lancaster, May 1895; Los Angeles, Mar. 27, 1879; Mt. Wilson, Apr. 30, 1916, June 13, 1904; Palmdale, June 9, 1918; Pasadena, no date; Santa Catalina Is., May 1932; South Gate, Apr. 9, 1952; Tanbark Flat, June 20–July 26, 1952. Orange Co.: Newport Bay, May 14, 1940. Riverside Co.: Andreas Cnyn., Apr. 3, 1927; Coachella, May 19, 1927; Idyllwild, June 7, 1940; Indio, June 2, 1918; Murray Cnyn., Mar. 24, 1918; Olanche, May 14, 1917; Palm Springs, Apr. 19, 1924, May 10, 1927, May 30, 1939. San Benito Co.: Idria, June 29, 1955. San Bernardino Co.: Forest Home, June 27, 1924; Lytle Creek, June 7, 1928. San Diego Co.: Upland, Dec. 4, 1952. Ventura Co.: Rincon Beach, July 4, 1923; Saticoy, June 11, 1927; Ventura, Apr. 25, 1932, Apr. 28, 1932, May 10, 1941; Santa Catalina Is., May 27, 1932. NEVADA. Esmeralda Co.: Goldfield, Aug. 4, 1905. NEW MEXICO. Hidalgo Co.: Animas Mts., 1670 m, Aug. 15, 1952. Lincoln Co.: Ruidoso, June 26, 1940. Santa Fe Co.: Santa Fe, no date. TEXAS. Brewster Co.: Alpine, July 11, 1938. UTAH. Iron Co.: Cedar City, Coal Cnyn., 1890 m, June 25, 1919. Juab Co.: Eureka, June 17, 1902, July 26, Aug. 14. Washington Co.: St. George, May 28, 1935. BAJA CALIFORNIA. 10 mi. south of Catavina, July 29, 1938; 17 mi. south of Ensenada, June 14, 1938.

There is a marked color variation with a geographical basis in *l. longulus*. Western populations, particularly in and around Los Angeles Co., Calif., are colored like *l. oregonensis* with a black or nearly black body and reddish-brown appendages. Farther east in Arizona and New Mexico, the coloration is more like that of *lanceatus* and *beameri* with body and appendage reddish brown. Few specimens have been seen from the intervening area of southeast California and we don't know if a cline of color characters exists. Genitalia and other structural characters are quite constant, although a more detailed analysis might reveal differences in some structures as the overall size and shape of the pronotum.

40. *Melanotus longulus oregonensis* (LeConte)

FIGURES 7*f*, 12*e*,*f*

Cratonychus oregonensis LeConte, 1853, p. 480.
Melanotus oregonensis.—Candèze, 1860, p. 373.—Lane, 1952, p. 67.
Melanotus longulus oregonensis.—Van Dyke, 1932, p. 331.
Melanotus variolatus LeConte, 1861, p. 377. [New synonymy.]
Melanotus longulus variolatus.—Van Dyke, 1932, p. 331.
Melanotus longulus franciscanus Van Dyke, 1932, p. 332. [New synonymy.]
Melanotus franciscanus.—Fall, 1934, p. 24.

Larger than *l. longulus;* frontal margin more broadly flattened than in *longulus*. Usually black with lighter colored antennae. Antenna flagellum often strongly serrate. Pronotal punctures large, as large as those on front and separated by less than own diameter; sides of pronotum often more strongly rounded than in *longulus* with marked concavity at base of hind angle.

Male genitalia as figured; apical blade weakly developed, gently rounded at base.

Female internal genitalia as figured, accessory gland shorter than bursa and distinctly clavate.

Male elytron: 9.0 ± 0.7 mm (7.3–10.3). 50 spec.

Female elytron: 9.1 ± 0.9 mm (7.5–10.9). 50 spec.

TYPES.—Lectotype of *oregonensis:* Male, labelled with dark blue circle (Oregon) (MCZ 2522). First specimen of type series selected as lectotype by authors in 1962.

Lectotype of *variolatus:* Male, labelled with gold circle (Calif.) (MCZ 2522). Third specimen of type series selected as lectotype by authors in 1962; first and second specimens are females, and males are definitive for recognizing the form.

Holotype of *franciscanus:* Male, hills back of Oakland, ca. May 8, 1910 (CAS 3132).

DISTRIBUTION.—Northwestern U.S., north of Tehachapi Mtns., California; overlaps with *longulus* in north-central Utah.

CALIFORNIA. Alameda Co.: Berkeley, May 9, 1940, June 9, 1949; Castle Rock Pk., May 25, 1932; Moraga, June 1, 1940; Niles, May 30, 1933; Pleasanton, June 5, 1932. Butte Co.: Oroville, May 29, 1926. Calaveras Co.: Big Trees, May 17, 1937; Murphys, May 23, 1936, Jan. 17, 1951. Contra Costa Co.: Brentwood, May 19, 1949; Giant, May 24, 1932; Mount Diablo, May 30, 1930, Apr. 20, 1942, May 3, 1957; Walnut Creek, May 30, 1913, June 1930. El Dorado Co.: Camino, June 21–29, 1948; Pollock Pines, July 10, 1948. Fresno Co.: Clovis, Apr. 21, 1931; Dalton Creek, Apr. 18, 1920; Mendota, Apr. 19, 1956. Humboldt Co.: Blocksburg, June 3, 1935; Fort Seward, May 22, 1935. Kern Co.: Bakersfield, May 5, 1931. Lake Co.: Anderson Springs, May 17, 1952. Lassen Co.: Doyle, May 20, 1934. Madera Co.: Bass Lake, July 24, 1934; Coarsegold, May 12, 1942; Madera, May 2, 1947; Northfork, Feb. 29–Mar. 30, 1920. Marin Co.: Fairfax, May 1922; Mill Valley, May 9, 1949. Mariposa Co.: Miami Ranger Sta., July 29, 1946. Merced Co.: Los Banos, Mar. 16, 1946; Panoche Hills, Apr. 23, 1921; Yosemite, May 29, 1937. Modoc Co.: Cedar Pass, July 29, 1946. Mono Co.: Leavitt Meadows, June 26, 1937. Monterey Co.: Carmel, Jan. 7, 1908. Napa Co.: Monticello, May 30, 1930. Nevada Co.: Greenhorn, August 28, 1954; Tahoe, June 3–July 8, 1915. Placer Co.: Auburn, May 1939; Newcastle, Apr. 23, 1949; Penryn, July 15, 1939. Plumas Co.: Keddie, June 12, 1941. Sacramento Co.: Sacramento, Apr. 23, 1922. San Benito Co.: June 24, 1933. San Joaquin Co.: Lodi, Apr. 23, 1931; Stockton, May 12, 1933; Tracy, May 4, 1933. San Mateo Co.: Halfmoon Bay, Mar. 16, 1952. Santa Clara Co.: Morgan Hill, May 17, 1922; Mtn. View, May 18, 1941; Palo Alto, May 7, 1920; San Jose, Mar. 2, 1941. Santa Cruz Co.: Santa Cruz Mtns., no date. Shasta Co.: Hat Creek, June 25, 1949, July 25, 1953; Redlands, June 6,

1953. Siskiyou Co.: Yreka, May 10, 1932. Solano Co.: Green Valley Falls, Apr. 26, 1941. Sonoma Co.: Santa Rosa, April 1942; Sobre Vista, May 24, 1910. Stanislaus Co.: Westley, June 8, 1948. Tehama Co.: Red Bluff, Apr. 14, 1928, May 11, 1949; Vina, May 11, 1920; Western, Oct. 30, 1920. Trinity Co.: Carrville, May 17, 1934, May 30, 1934. Tulare Co.: Kaweah; Sequoia Nat. Pk., June 13, 1929, May 25, 1930; Visalia; Wood Lake, Mar. 28–May 3, 1947. Tuolumne Co.: Hardin Flat, May 29, 1955. Yolo Co.: Winters, Apr. 23, 1950. Yuba Co.: Marysville, June 5, 1933. IDAHO. Bannock Co.: Lava Hot Springs. Canyon Co.: Parma, May 18, 1930. Lincoln Co.: Shoshone, June 10, 1938. MONTANA. Lewis and Clark Co.: Wolf Creek, July 4, 1938. NEVADA. No other data. OREGON. Baker Co.: Richland, June 14, 1940. Benton Co.: Corvallis, July 2, 1945. Douglas Co.: Drain, May 19, 1914. Harney Co.: June 22, 1912. Jackson Co.: McLeod St. Pk., May 22, 1960; Medford, June 12, 1915, May 14, 1954; Talent, May 4, 1954. Lake Co.: Lakeview, May 27, 1957. Yamhill Co.: June 1913, May 1934. UTAH. Cache Co.: June 26, 1954; Lewiston, May; Bear River, Logan, 1925. Juab Co.: Eureka, July 2 (with *l. longulus*). Salt Lake Co.: Apr. 14, 1909; Ft. Douglas, June 7, 1926. Tooele Co.: Stockton, June 22, 1917. Utah Co.: Dividend, June 1921; Provo, June 2, 1939; Provo Cnyn., May 21, 1913. Weber Co.: Roy, July 14, 1957. WASHINGTON. Kittitas Co.: Yakima River, 8 mi. south of Ellensburg, July 22, 1959. Walla Walla Co.: Walla Walla, June 1936. Whitman Co.: Pullman, May 13, 1930; Wawawai, May 13, 1944. BRITISH COLUMBIA. Oliver, May 22, 1924; Vernon, May 1, 1924; Victoria, June.

The subspecies *longulus* and *oregonensis* are closely related forms, allopatric in distribution (fig. 3). *Longulus* differs from *oregonensis* rather constantly in having a smaller average size, being lighter in color, the nasale better developed, the fovea a little deeper, the antennae less sharply serrate, and the flagellar segments smaller. These features are subject to some variation and a small percentage of specimens possesses characters of the other subspecies. The genitalic characters, on the other hand, seem entirely constant within the ranges of the respective subspecies. Specimens have not been seen which are intermediate between the two subspecies in genitalic characters. A specimen from northern Utah is intermediate in size and color but *oregonensis* on genitalic characters. Perhaps these forms have reached full species status and there is no interbreeding between populations. This is unproven, however, and we have seen few specimens from the borders of the two forms' area. In our opinion, the close relationship and allopatric distribution is best shown by the nomenclatorial rank of subspecies.

Van Dyke (1932) recognized the affinity of *longulus* and *oregonensis* and was the first to group them as subspecies of one species. At the same time he recognized the third subspecies, *franciscanus*. He presents a scheme, that our observations do not support, in which the smaller and lighter *longulus* of southern California gets larger and darker in populations to the north in the Sierra Nevada and the Great Basin. The lowland populations in central California supposedly got

still larger and darker and constituted the subspecies *franciscanus*. This suggests a north-south cline from southern California and east-west cline through central California. Our studies show a sharp break between the populations along a line in the Tehachapi Mountains, California, and if there is a north-south cline, it is abrupt and not gradual as outlined by Van Dyke. On the average, specimens from the mountains are smaller and those in the lowlands larger. (Although one of the smallest specimens of *oregonensis* in our material is from Pleasanton, Alameda Co., Calif.) This is most likely a phenotypic expression of a more vigorous climate, shorter summer season, and perhaps less abundant food in the mountains, and we think has nothing to do with the genotypic characters which distinguish the two subspecies. The form *franciscanus* is regarded as merely a larger and darker phenotype of *oregonensis* that enjoys a more favorable environment but does not warrant nomenclatorial recognition.

The species *variolatus* has been synonymized with *longulus* by Van Dyke (1932) on the grounds that it was based on individual variants and in this we concur.

41. *Melanotus gradatus* LeConte

FIGURE 7*g*; PLATE 1*p*

Melanotus gradatus LeConte, 1866, p. 390.—Blatchley, 1910, p. 753.—Thomas, 1941, p. 260.

MALE.—Body color reddish brown, covered with white or yellowish vestiture that grows denser and sometimes nearly velvety posteriorly on pronotum.

Head: Front with pair of shallow anterolateral depressions; margin not strongly protuberant above nasale, evenly rounded or flattened in front when viewed from above; parantennal fovea moderately large, deep, semicircular, foveal tragus small; nasale raised slightly, width from 1¼ to 1½ times height. Mandible with large teardrop-shaped pit. Antenna reddish brown, exceeds tip of hind angle by one-half segment or less, segment 3 nearly as large as 4, 4 about 1½ times as long as maximum width; erect male hairs very short, fine, rather sparse, and easily overlooked.

Pronotum about as wide as long; punctures on anterior two-thirds as large as those on front, and separated by distance equal to less than own diameter, those on posterior one-third grow much smaller and denser, often giving surface granulose appearance; sides of pronotum vary from straight and diverging posteriorly to curved with slight concavity at base of hind angle; hind angles divergent, carina usually extending cephalad of base of hind angle and weakened anteriorly. Genitalia as figured; paramere with apical blade.

Elytron: 7.9–8.2 mm. 3 spec.

FEMALE.—Antenna extends just to tip of hind angle or short of tip by one-half segment; internal genitalia as figured, bursa with 2 patches of tacklike spines, accessory gland slender and shorter than bursa, spermathecal duct branches near its base.

Elytron: 8.5–9.5 mm. 5 spec.

TYPE.—Holotype of *gradatus:* Male, Maryland. Only specimen in type series, not seen by us.

DISTRIBUTION.—Maryland west to Kansas and Arkansas.

ARKANSAS: Lawrence, Washington; April, June. ILLINOIS: Gallatin, Pope, Pulaski, St. Clair; May, June. INDIANA: Clark; June. KANSAS: Douglas; June. OHIO: Hamilton; June.

The fine vestiture and punctures on the posterior part of the pronotum, the short antennae, and moderately large size readily distinguish *M. gradatus* from other North American *Melanotus*.

42. *Melanotus insipiens* (Say)

FIGURES 7*h*, 12*g*

Elater insipiens Say, 1825, p. 267.—1839, p. 184.
Cratonychus insipiens.—LeConte, 1853, p. 480.
Melanotus insipiens.—Candèze, 1860, p. 361.—Fattig, 1951, p. 21.
Cratonychus tenellus Erichson, 1842, p. 114.—LeConte, 1853, p. 480.
Melanotus tenellus.—Candèze, 1860, p. 362.—Fattig, 1951, p. 22.

MALE.—Very small, light to dark reddish brown, species with white or yellowish vestiture.

Head: Front with shallow, narrow anterior depression or lacking entirely; margin dark reddish brown, not strongly protuberant over clypeus, evenly rounded when viewed from above, slightly upturned; parantennal fovea deep, well defined, semicircular; nasale wider than high. Mandible with deep, rounded, or elongate pit. Antenna exceeds tip of hind angle by 2 to 2½ segments, segment 3 intermediate in size between 2 and 4, 4 about 1¾ times as long as maximum width; erect male hairs moderately long and sparse.

Pronotum a little wider than long; punctures at center usually separated by distance equal to about own diameter, slightly smaller than punctures on front; sides of pronotum straight behind small anterior curvature and divergent posteriorly; hind angles divergent, carina extending cephalad of angle base, close to and paralleling sides.

Last visible sternite of abdomen with punctures on posterior half round and considerably larger than on rest of abdominal venter. Genitalia as figured; paramere with apical blade.

Elytron: 3.5±0.2 mm (3.1–4.0). 50 spec.

Female. Antenna exceeds tip of hind angle by one-half segment; internal genitalia as figured, bursa with few tacklike spines, accessory gland and spermathecal duct originate close together at apex of bursa, duct diverticulum very short.

Elytron: 3.6±0.2 mm (3.0–4.3). 50 spec.

TYPES.—Type of *insipiens*: Specimens lost.

Lectotype of *tenellus*: Female, "Amer. Sept." (ZM). Lectotype selected by Quate in 1960.

DISTRIBUTION.—New Jersey to Florida, west to Texas.

ALABAMA: Mobile; June. ARKANSAS: Hempstead; June. FLORIDA: Columbia, Pinellas, Osceola, Volusia, Wakulla; April, May. GEORGIA: Charlton, Houston; May. NEW JERSEY: Burlington, July. NORTH CAROLINA: Bladen, Johnston, Lenoir, Moore, Pender, Richmond, Sampson, Wake, Wayne; May, July. SOUTH CAROLINA: Florence; January. TEXAS: Harrison; May.

The small size is usually sufficient to separate *insipiens* from other North American *Melanotus*. It might be confused with *americanus*, but in that species the pronotal punctures are much smaller and sparser. *M. angustatus* and *prasinus* are also small species of the *americanus* group, but they are larger than *insipiens* and have conspicuously different genitalia.

43. *Melanotus leonardi* (LeConte)

FIGURES 7*k*, 12*h*, *i*

Cratonychus Leonardi LeConte, 1853, p. 475.

Melanotus leonardi.—Candèze, 1860, p. 349.—Thomas, 1941, p. 259.—Dietrich, 1945, p. 56.—Fattig, 1951, p. 20.

MALE.—Head, anterior border of pronotum, elytron, abdomen, and venter black, antenna and legs dark reddish brown and pronotum orange colored.

Head: Front usually with marked, anterior depression; margin scarcely protuberant in front of nasale, rounded or broadly flattened across center when viewed from above; nasale flat, parantennal foveа absent or very shallowly indicated. Mandible without pit. Antenna extends to or beyond tip of hind angle by 1 segment, segment 3 small, little larger than 2, but much smaller than 4; erect male hairs short but dense enough to be seen easily.

Pronotum wider than long, ratio of width/length=1.1–1.2; punctures equal or subequal to those on front, central ones separated by distance equal to about own diameter; sides of pronotum evenly rounded with marked concavity at base of hind angles; hind angles divergent; carina weak, barely extending to hind angle base. Genitalia as figured, apical blade very small.

Elytron: 6.6 mm (5.9–7.3). 16 spec.

FEMALE.—Antenna extends about to tip of hind angle, segment 3 intermediate in size between 2 and 4; internal genitalia as figured, bursa with small cluster of spikelike spines, accessory gland short and thicker than duct, spermathecal duct branches at about basal one-third.

Elytron: 7.1 mm (6.3–7.8). 20 spec.

TYPES.—Lectotype of *leonardi:* Male, labelled with pink circle "prob. Pa." (MCZ). Second specimen of type series selected as lectotype by authors in 1962; second, a male, chosen in preference to first, a female, because males more accurately identified.

DISTRIBUTION.—Quebec to North Carolina, west to Texas.

CONNECTICUT: Litchfield; June. INDIANA: Marion; June. MAINE: Hancock, Oxford, Washington; July. MASSACHUSETTS: Suffolk, Worcester; June. NEW HAMPSHIRE: Cheshire, Strafford; no dates. NEW YORK: Essex, Jefferson; April, June. NORTH CAROLINA: Buncombe; June. TEXAS: Bexar; June. VERMONT: No data. ONTARIO: Mustota Dist., Orrville; June. QUEBEC: Duparquet, Mt. St. Hilaire, Perkins Mills; June, July.

44. *Melanotus taenicollis* (LeConte)

FIGURES 7*l*, 12*j*

Cratonychus taenicollis LeConte, 1853, p. 475.
Melanotus taenicollis: Candèze, 1860, p. 348.—Thomas 1941, p. 259.—Dietrich, 1945, p. 56.

MALE.—Black and orange or reddish brown, body largely black with orange on margins and ventral part of pronotum, on anterior border of elytra, on legs, and over entire, or on margins of, abdominal venter, antenna usually dark reddish brown but lobes of flagellar segments sometimes lighter colored.

Head: Front with anterior depression; margin scarcely protuberant in front of nasale, coming to point in center when viewed from above; nasale flat, parantennal fovea absent. Mandible without pit. Antenna short of tip of hind angle apex by about 1 segment; segment 3 small, little larger than 2, but much smaller than 4, flagellar segments broad; erect male hairs may be sparse but easily seen.

Prontotum wider than long, ratio of width/length=1.15–1.26; punctures subequal to those on front, central ones separated by about own diameter; sides of pronotum evenly rounded with marked concavity at base of hind angles; hind angles parallel or divergent, carina weak, extending just to hind angle base. Genitalia as figured; paramere with apical blade.

Elytron: 6.5±0.3 mm (6.0–6.9). 14 spec.

FEMALE.—Similar to male but less variation in body color; antenna short of tip of hind angle by about 2 segments, segment 3 intermediate in size between 2 and 4; internal genitalia as figured, bursa with cluster of spinelike spines, smaller and more numerous than in *leonardi*.

Elytron: 6.7±0.4 mm (6.1–7.5). 16 spec.

TYPES.—Lectotype of *taenicollis:* Male, labelled with pink circle "Middle States; Pa." (MCZ 2512). First specimen of type series

selected as lectotype by authors in 1962; second specimen probably not a type, since only one mentioned in original description.

DISTRIBUTION.—Eastern U.S.

NEW JERSEY: Essex; no dates. NEW YORK: Dutchess; May, June. PENNSYLVANIA: Delaware; June.

M. taenicollis and *leonardi* are the only two North American *Melanotus* with a contrasting, bicolored pattern and are easily distinguished from other species because of this. The black center of the pronotum and orange on the abdominal venter of *taenicollis*, as well as the genitalic structures, readily separate it from *leonardi*.

The *cribricollis* Group

Pronotal punctures large and dense; male paramere short, ends far basad of aedeagus apex.

45. *Melanotus cribricollis* Candèze

FIGURES 7*j*, 12*l*,*m*; PLATE 1*l*

Melanotus cribricollis Candèze, 1860, p. 358.

MALE.—Large, dark reddish species with sparse, short yellowish vestiture.

Head: Front with marked, anteromedian depression; margin scarcely protruding in front of nasale, angulate and concave in center when viewed from above, also sunken or impressed in center; nasale flat, short, and much wider than high; parantennal fovea shallow (1 spec. with deep fovea), circular, or semicircular. Mandible with shallow, elongate pit near lower border. Antenna short, fails to reach tip of hind angle by 4–5 segments, segment 3 intermediate in size and shape between 2 and 4; flagellar segments broad and nearly rectangular, lower angles fulvous; only a few short erect male hairs on base of lower margin, easily overlooked and difficult to distinguish males from females.

Pronotum wider than long, punctures very large and dense, margins nearly contiguous; sides of pronotum straight behind strong anterior curvature, infrequently with concavity at base of hind angle; hind angles subparallel, each with strong carina extending to or little cephalad of hind angle base and sometimes with weak, shorter median carina about two-thirds length of larger one. Genitalia as figured; paramere shorter than aedeagus, ending in broad, apical blade.

Elytron: 7.9 mm (6.5–8.5). 12 spec.

FEMALE.—Internal genitalia as figured, accessory gland large and spherical, bursa with large, dense patch of spikelike spines.

Elytron: 7.9±0.5 mm (7.3–9.0). 18 spec.

TYPE.—Holotype of *cribricollis:* Female, "Amer. Bor." (BMN). Only specimen in type series.

DISTRIBUTION.—Southwestern U.S., Baja California.

ARIZONA: Cochise, Maricopa, Pima, Pinal; April, September. CALIFORNIA: San Diego; April. BAJA CALIFORNIA: 10 mi. southwest of Comondu, 25 mi. west of LaPaz, 8 mi. northwest of Los Angeles Bay, 22 mi. northwest of Penjamo, St. Bartlme Bay, 10 mi. south of San Jose del Cabo; June, September.

M. cribricollis and *chiricahuae* are readily separable from other North American *Melanotus* by the large pronotal punctures, shallow mandibular pit, short antennae, and peculiar male genitalia. Their divergence from other North American species and distribution in the southwestern U.S. suggests they are of Neotropical origin.

M. cribricollis differs from *chiricahuae* in its shorter antennae, shape of the frontal margin, more rectangular shape of the flagellar segments, better developed parantennal fovea, and different shape of the male genitalia.

46. *Melanotus chiricahuae* Knull

FIGURES 7*i*, 12*k*

Melanotus chiricahuae Knull, 1962, p. 34.

MALE.—Large, dark reddish-brown species with sparse, yellowish vestiture.

Head: Front with marked anterior depression; margin protruding in front of nasale by about twice width of rim, rounded when viewed from above; nasale flat, parantennal fovea very shallow, faintly crescent shaped. Mandible with shallow, elongate pit near lower border. Antenna exceeds tip of hind angle by about ½ segment, segment 3 intermediate in size between 2 and 4, flagellar segments triangular; erect male hairs short, usually dense but may be scarcely visible.

Pronotum wider than long, punctures very large and dense, separated by less than own diameter; sides of pronotum straight behind anterior curvature and usually subparallel but may be divergent posteriorly; hind angles divergent, each with a strong carina extending cephalad of hind angle base and incurved anteriorly and a weak, shorter, median carina about ¾ length of larger one. Genitalia as figured; paramere much shorter than aedeagus, ending in unusual recurved apex.

Elytron: 8.6±0.5 mm (7.6–9.5). 21 spec.

FEMALE.—Similar to male; antenna shorter, extends to tip of hind angle or short of tip by 1 segment; genitalia as figured, bursa with thick patch of simple spines, accessory gland short, originates well before apex and origin of spermathecal duct.

Elytron: 9.2±0.5 mm (8.5–10.5). 16 spec.

DISTRIBUTION.—Southwestern U.S.

ARIZONA: Cochise, Santa Cruz; June–August. NEW MEXICO: Hidalgo; August.

The large pronotal punctures of this species are distinctive, although it might be confused with *similis* in the same area. The punctures of *chiricahuae* are larger than in *similis*, the antennae are shorter, and it has a weak, shallow mandibular pit. The male and female genitalia are easily distinguished from other species.

Species Incertae

Melanotus abdominalis (Erichson)

Cratonychus abdominalis Erichson, 1842, p. 104.—LeConte, 1853, p. 481.
Melanotus abdominalis.—Candèze, 1860, p. 352.

TYPE.—Holotype: Female, "Amer. Sept." (ZM, 17036). Only specimen in type series.

This species has subequal second and third antennal segments, a jutting frontal margin, fine dense pronotal punctures, and a long, slender, heavily spined female bursa. It is unlike any species which we have encountered in North America and is unfamiliar to us. We suspect that it is not a North American species and the type has been labelled in error.

Melanotus cinereus (Weber)

Elater cinereus Weber, 1801, p. 77.

This species is usually listed as a synonym of *similis* (=*fissilis*) or *communis*, but the types apparently are lost, and we are unable to apply the name to a known species.

Melanotus despectus Candèze

Melanotus despectus Candèze, 1860, p. 343.

We have not seen types of this species, but Mr. Lane (in litt.) states that he saw specimens at the Deutschen Entomologischen Institut, Berlin, which might be the types. According to Lane, these are the same as *ignobilis* and if those specimens can be shown to be types, *despectus* would fall as a synonym of *ignobilis*.

Melanotus effetus Candèze

Melanotus effetus Candèze, 1860, p. 355.

This may be only a small form of *communis* according to Lane (in litt.), who found specimens at the Zoologische Museum der Humboldt-Universität that might be the types.

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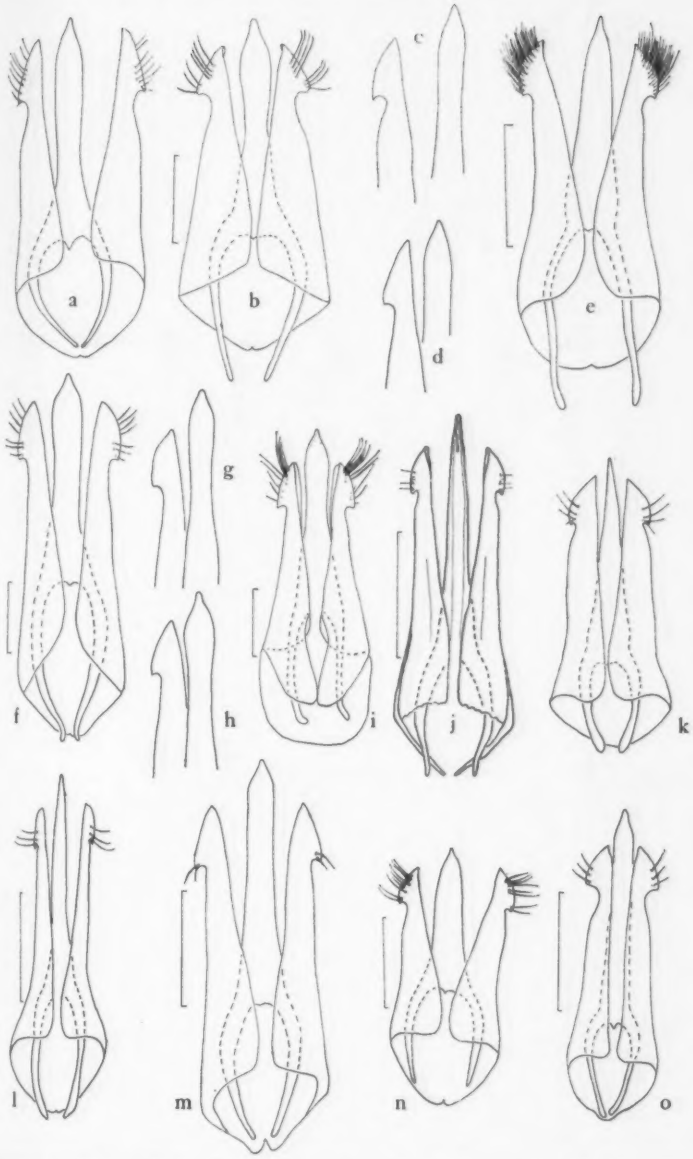

FIGURE 4.—Male genitalia of *Melanotus* species: *a–d, similis; e, spadix; f–h, decumanus; i, castanipes; j, communis; k, indistinctus; l, dietrichi; m, verberans; n, miscellus; o, emissus.* (Scale lines=0.5 mm.)

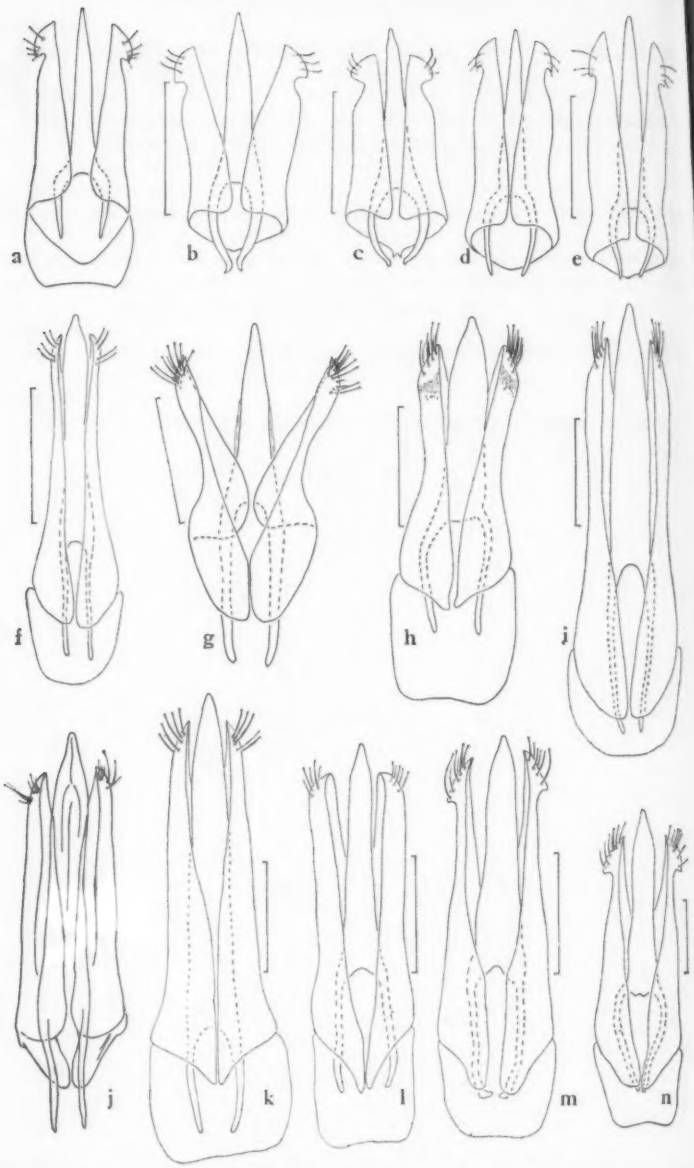

FIGURE 5.—Male genitalia of *Melanotus* species: *a, lanei; b, c, pilosus; d, e, opacicollis; f, clandestinus; g, ignobilis; h, morosus; i, depressus; j, cribulosus; k, piceatus; l, hyslopi; m, sagittarius; n, corticinus.* (Scale lines=0.5 mm.)

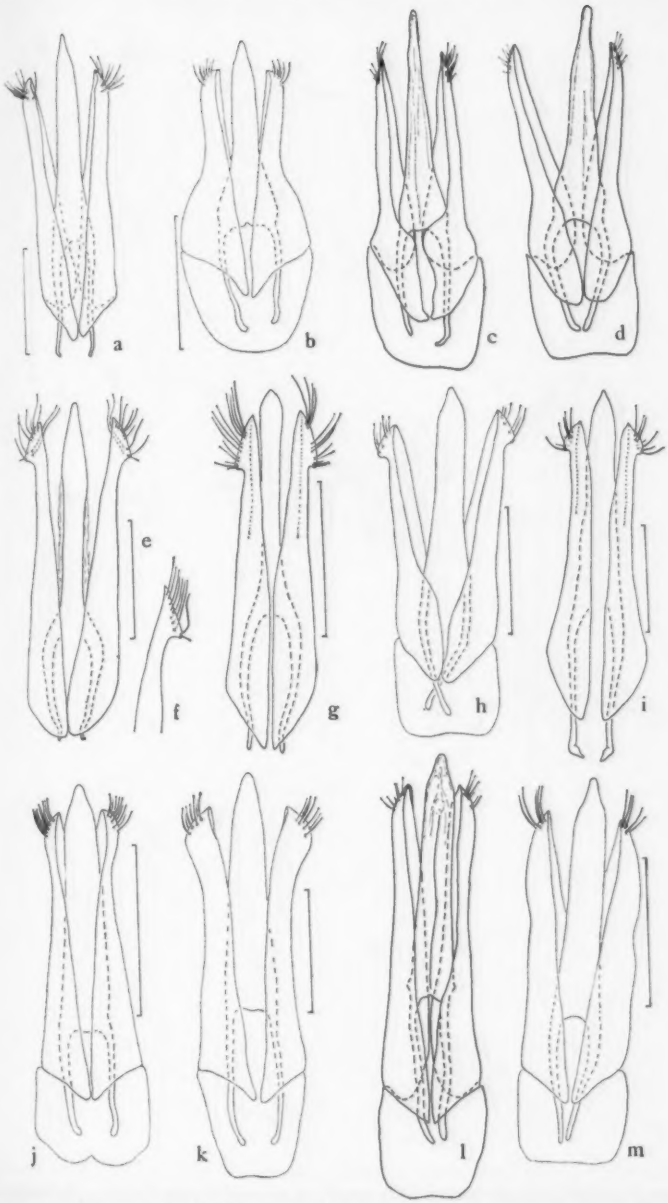

FIGURE 6.—Male genitalia of *Melanotus* species: *a, prasinus; b, testaceus; c, trapezoideus; d, tenax; e, f, macer; g, difficilis; h, parallelus; i, infaustus; j, americanus; k, cribriventris; l, perlinax; m, beameri.* (Scale lines=0.5 mm.)

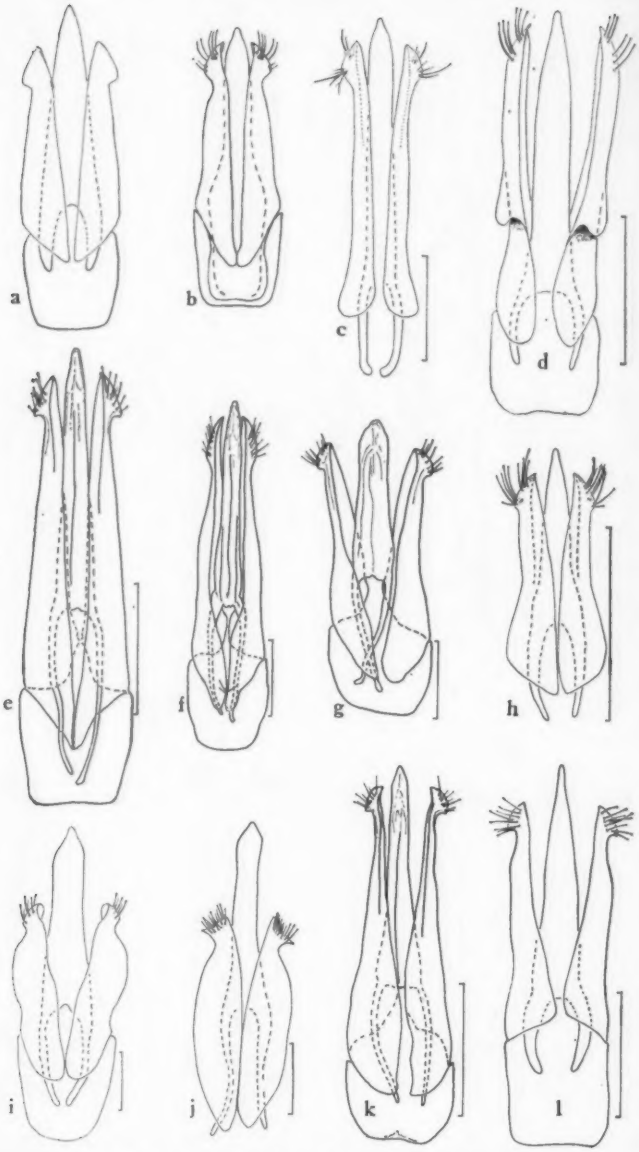

FIGURE 7.—Male genitalia of *Melanotus* species: *a, concisus; b, obscuratus; c, lanceatus; d, hamatus; e, longulus longulus; f, longulus oregonensis; g, gradatus; h, insipiens; i, chiricahuae; j, cribricollis; k, leonardi; l, taenicollis.* (Scale lines=0.5 mm.)

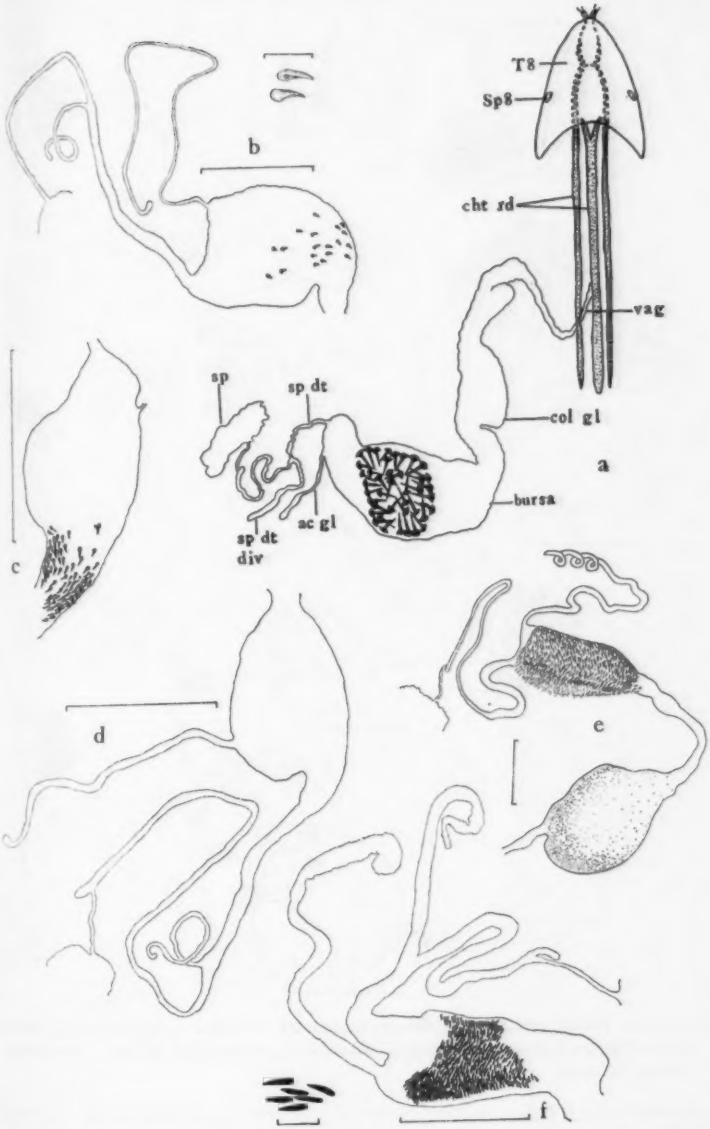

FIGURE 8.—Female genitalia of *Melanotus* species: *a*, hypothetical species with structures labelled; *b*, *similis*, "normal"; *c*, *similis*, "spiny"; *d*, *decumanus*; *e*, *spadix*; *f*, *castanipes*. (Scale lines=1.0 mm and 0.1 mm.)

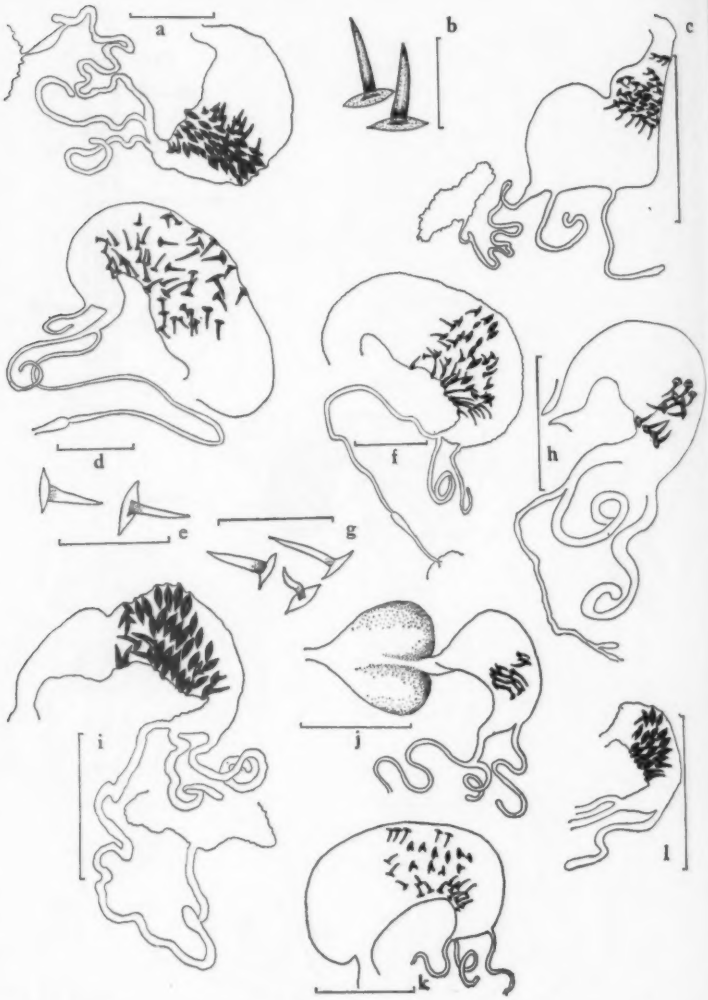

FIGURE 9.—Female genitalia of *Melanotus* species: *a,b, communis; c, miscellus; d,e, didrichi; f,g, indistinctus; h, lanei; i, verberans; j, opacicollis; k, emissus* (?); *l, pilosus.* (Scale lines= 1.0 and 0.5 mm.)

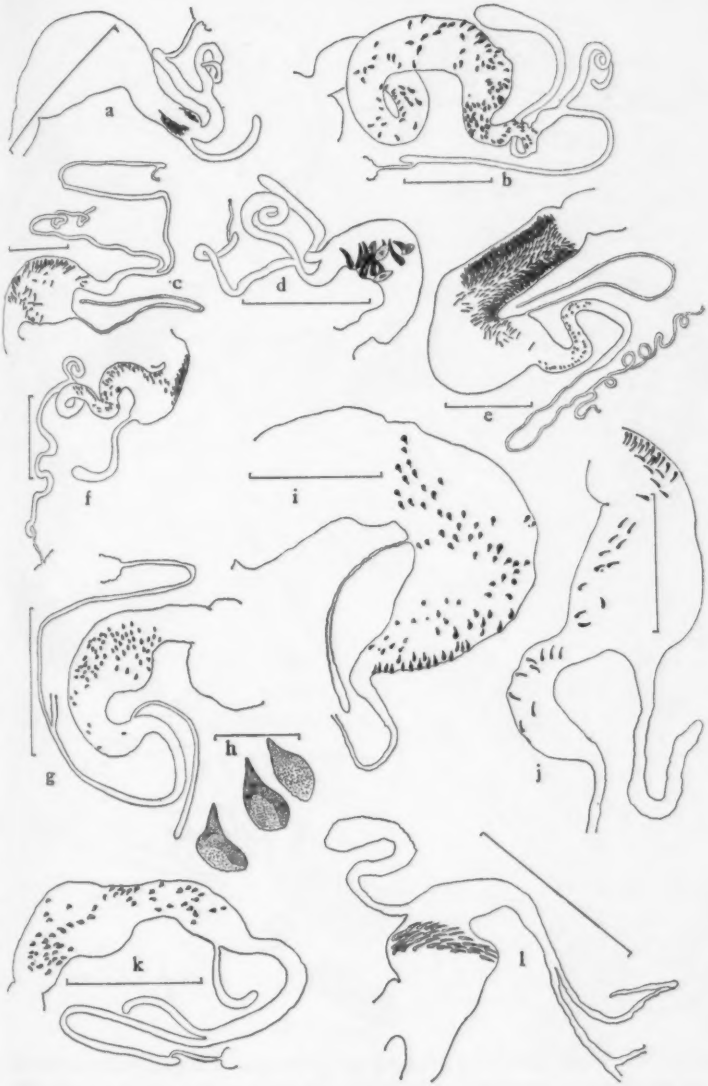

FIGURE 10.—Female genitalia of *Melanotus* species: *a, ignobilis; b, depressus; c, sagittarius; d, cribulosus; e, morosus; f, hyslopi; g,h, prasinus; i, corticinus; j, piceatus; k, pertinax; l, macer.* (Scale lines= 1.0 and 0.05 mm.)

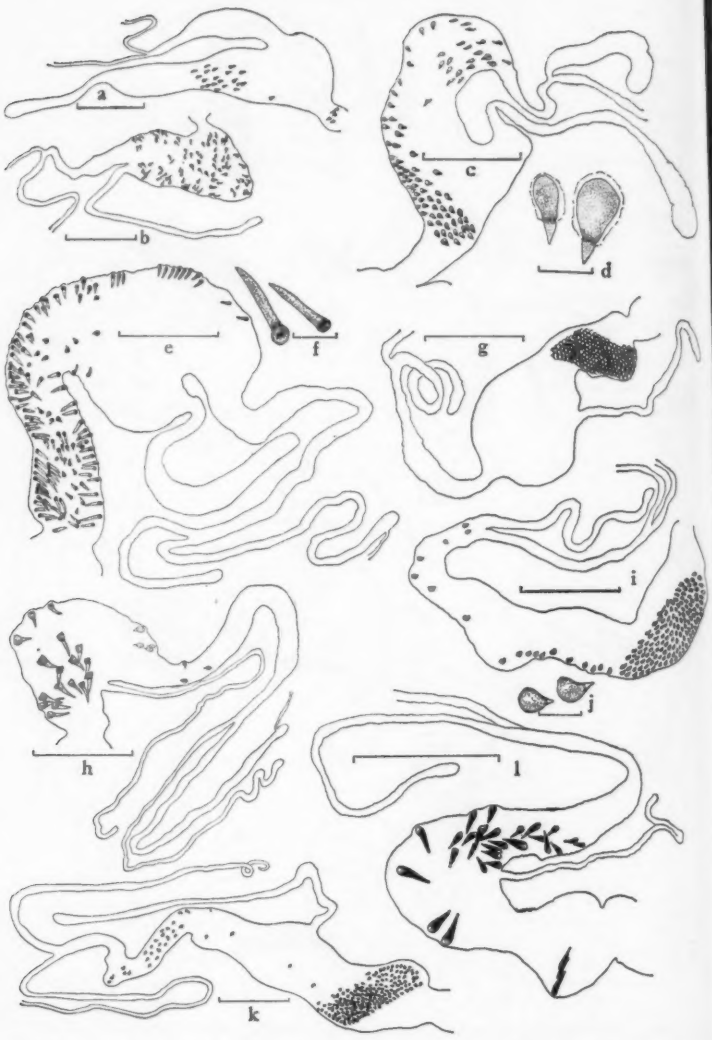

FIGURE 11.—Female genitalia of *Melanotus* species: *a, tenax; b, trapezoideus; c,d, testaceus; e,f, americanus; g, parallelus; h, cribriventris; i,j, infaustus* (?); *k, gradatus; l, obscurdus.* (Scale lines=0.5 and 0.05 mm.)

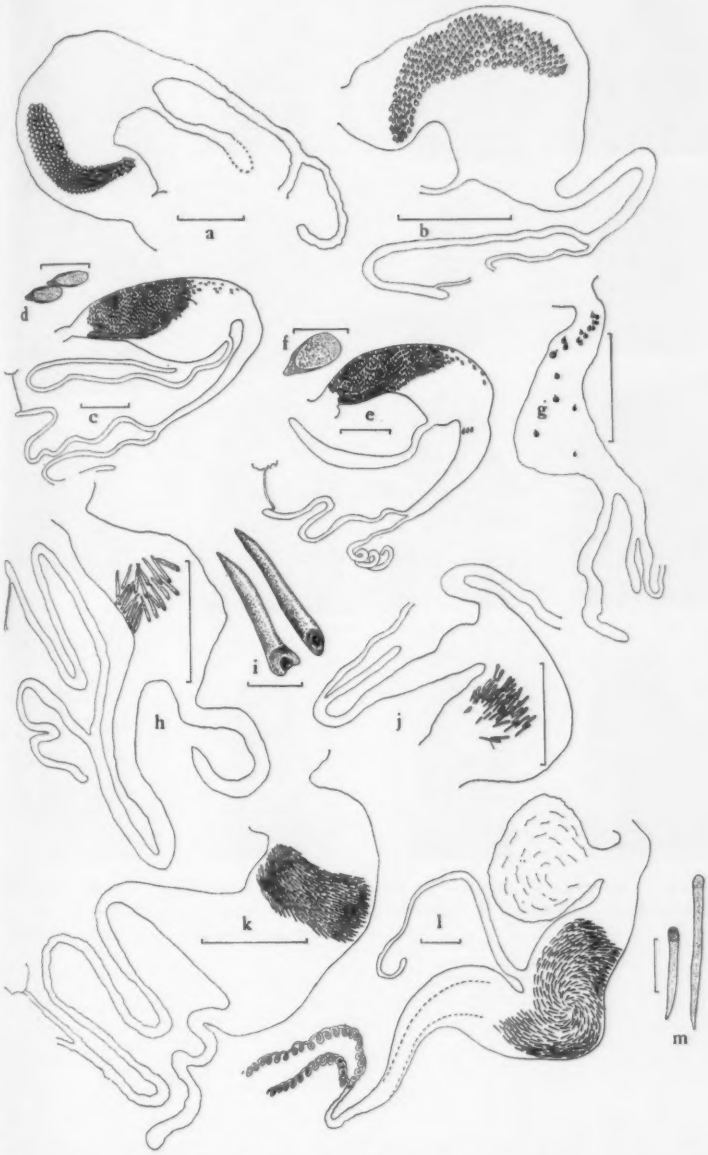

FIGURE 12.—Female genitalia of *Melanotus* species: *a, concisus* (?); *b, lanceatus; c,d, longulus longulus; e,f, longulus oregonensis; g, insipiens; h,i, leonardi; j, taenicollis; k, chiricahuae; l,m ,cribricollis.* (Scale lines=0.5 and 0.05 mm.)

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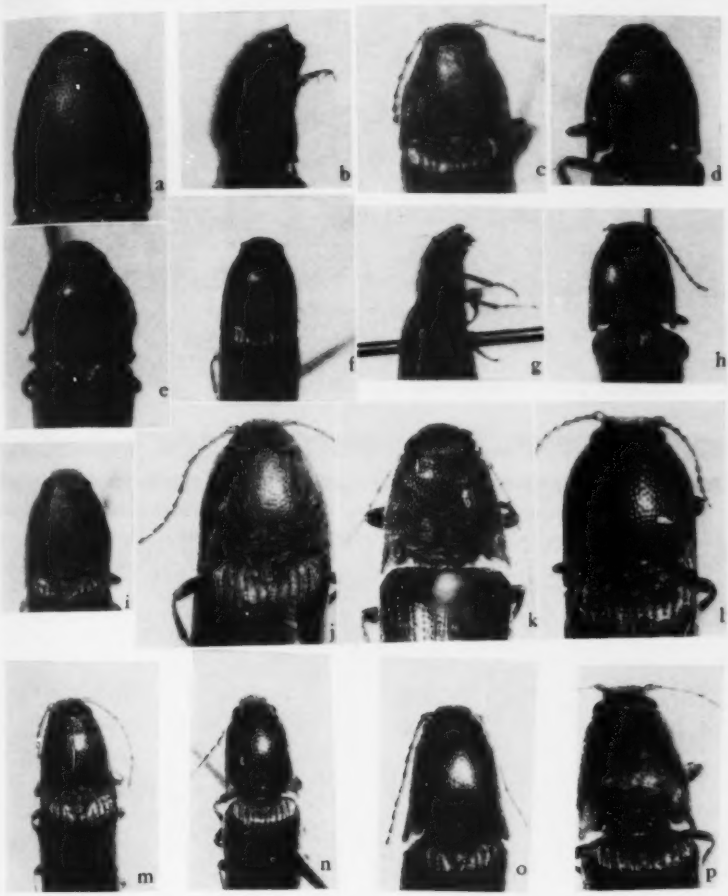

Heads of *Melanotus* species: *a, similis; b, decumanus; c, castanipes; d, communis; e, verberans; f, lanei; g, pilosus; h, emissus; i, opacicollis; j, depressus: k, sagittarius; l, cribricollis; m, tenax; n, parallelus; o, infaustus; p, gradatus.*